

## Jockey Pump SP-140-290 Operation

### General

The jockey pump in the pump house east of the guard house is the primary pump to keep pressure on the plant fire lines. The jockey pump is designed to come on automatically when the fire system pressure drops below approximately 135/140 psig and to shut off automatically when the jockey pump pressures the system above 160/165 psig. The pump can deliver approximately 10 gallons per minute. Any leak in the system greater than 10 GPM cannot be kept up with the jockey pump. If it cannot keep up, the fire pump should come on automatically. (See following for specific instructions).

### Jockey Pump Operation

1. Open jockey pump suction valve.
2. Check jockey pump discharge pressure gauge to make sure there is a positive pressure.
3. Open jockey pump discharge valve.
4. Place jockey pump controller in the auto switch position.
5. If there is doubt about the functioning of the jockey pump or its controller, bleed enough water from the fire line to lower the fire line pressure (or wait for the pressure to fall normally) and determine if the jockey pump will come on and shut off normally (automatically).
6. If the jockey pump cannot maintain pressure, report the problem to allow fire line or pump repairs.
7. If for some reason the automatic on/off function of the jockey pump controller does not work, the pump may be operated by moving the switch to hand position to turn the pump on or the "off" position to turn the pump off.
8. Check the pump periodically for overheating or rapid on/off cycling. Report any of these problems to allow for repairs.
9. Keep the valves in the locked open position except as directed for service or otherwise.
10. Report excessive seal leakage to allow timely repairs to be made.

## Fire Water Booster Pump Operation

### P-140-289

#### General

The fire pump in the pump house east of the guard house is a 1000 gallon per minute pump. It is set to come on automatically when the fire line pressure drops below approximately 130/135 psig. Once the pump is started automatically, it has to be stopped manually.

#### Fire Pump Operation

1. Open fire pump suction valve.
2. Check for adequate positive suction pressure.
3. If the pump has been emptied of water for service or otherwise, fill the casing with water.
4. Open the fire pump discharge valve.
5. Place the fire pump controller in the auto switch position, left slot and up.
6. Keep the valves in the locked open position except for repairs.
7. If, for some reason, the automatic switch position does not allow the pump to run, and there is a need to have the fire pump "on", switch the pump to emergency "start". The pump can be stopped by using the manual "stop" position of the switch gear or by pressing the "stop" button.
8. Report excessive packing leakage or relief valve leakage to allow timely repairs to be made.

Fire Pump 2000 GPM  
SP-140-123  
Operating Instructions

Automatic Operation

Placing in Service

1. Check line pressure gauge to be sure that the line pressure is above 125 psi.
2. Check that the circuit breaker (disconnecting means) is "off".
3. Press the release button and turn the isolating means switch "on".
4. Turn the circuit breaker "on". The pump is now in automatic operation. If the system pressure is low (below 125 psi), the fire pump will come on. Silence the alarm and turn off the pump with the stop button.

Taking Out of Service

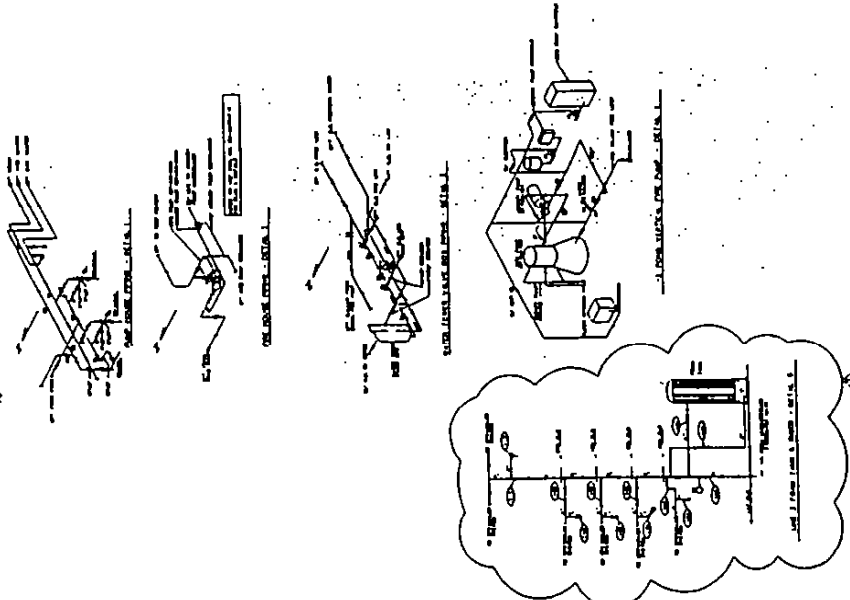
1. Turn the circuit breaker "off".
2. Press the release button and turn the isolating means switch "off". Silence the alarm.

Note: This pump will not shut off automatically. To shut it off manually, make sure that the yellow starting lever is down and press the stop button.

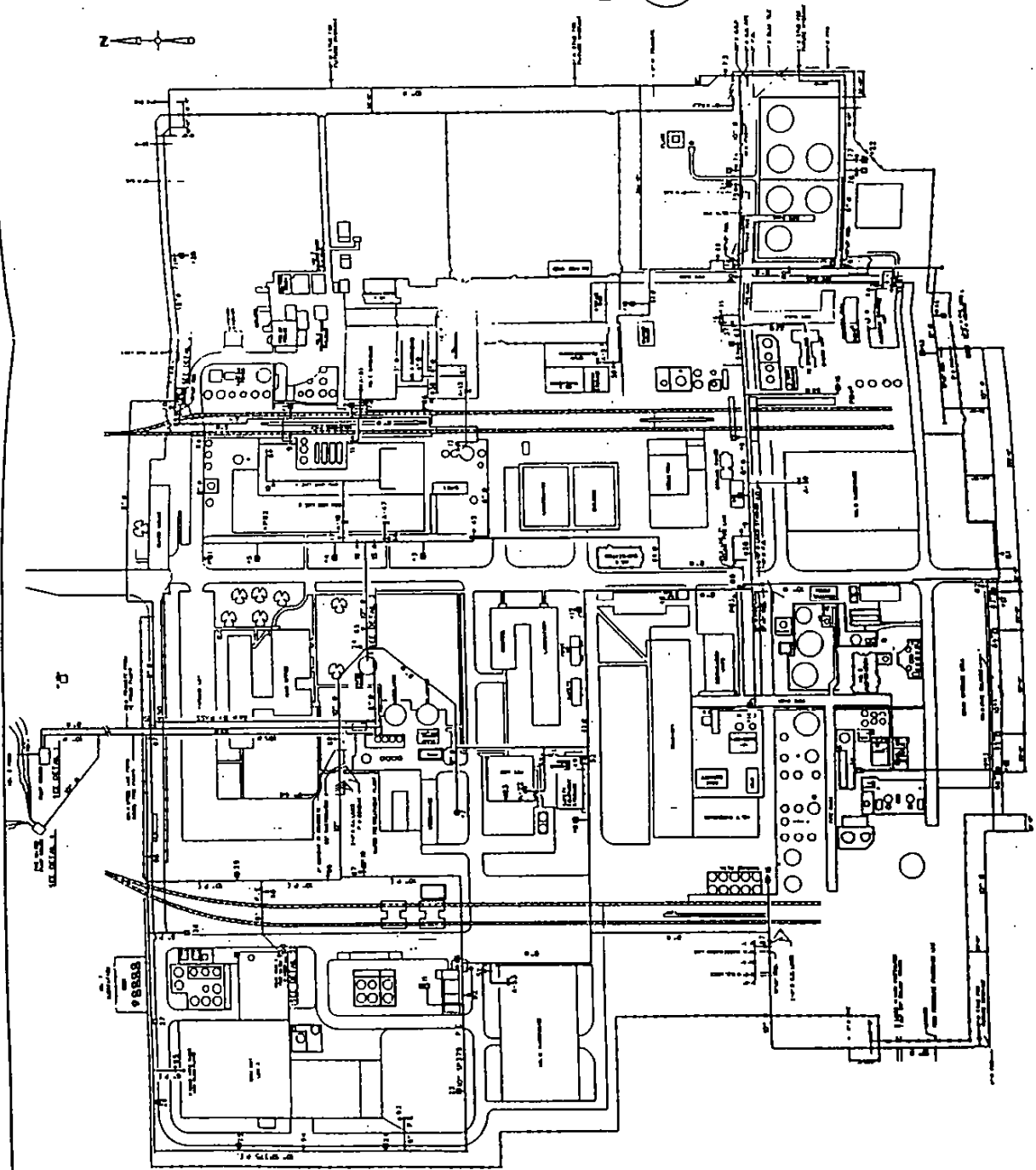


LEGEND:

- FIRE LOOP
- MONITOR NOZZLE
- FIRE HOUSE HYDRANT AND HOSE STATION
- HOSE SIDE OF FIRE HOUSE
- POST INDICATING VALVE
- FIRE HYDRANT WITH MONITOR NOZZLE
- SPRINKLING SYSTEM STANDPIPE & ALARM
- PUSH BUTTON ALARM STATION



NOTE: 1. LAST VALVE IS #113  
2. THE LAST PB IS #6



FIRE LOOP		FIRE LOOP	
NO.	DESCRIPTION	NO.	DESCRIPTION
1	MONITOR NOZZLE	11	MONITOR NOZZLE
2	MONITOR NOZZLE	12	MONITOR NOZZLE
3	MONITOR NOZZLE	13	MONITOR NOZZLE
4	MONITOR NOZZLE	14	MONITOR NOZZLE
5	MONITOR NOZZLE	15	MONITOR NOZZLE
6	MONITOR NOZZLE	16	MONITOR NOZZLE
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89	MONITOR NOZZLE	99	MONITOR NOZZLE
90	MONITOR NOZZLE	100	MONITOR NOZZLE

SEE PLAN

**APPENDIX G**  
**CERTIFICATION LETTERS**

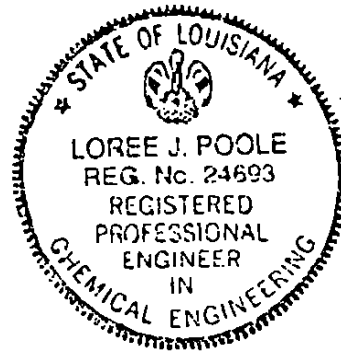
**CERTIFICATION STATEMENT**

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

Loree J. Poole, P.E.

Loree J. Poole, P.E.

Louisiana Registration No. 24693



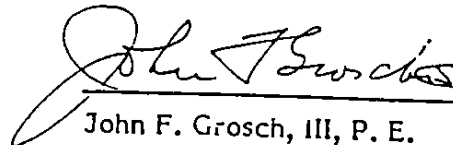
**CERTIFICATION OF SUBSURFACE SOILS  
AND GROUNDWATER CONDITIONS  
(LAC 33: VII.709.C.1.c.)**

The attached certification was included in the March 1988 Solid Waste Permit Application. The recovery well system described in the attached certification has been approved by LDEQ and is currently in operation.

**Certification by the person who prepared the plans that the facility meets the requirements outlined in these regulations.**

A thorough review was made of all existing boring logs, soil characterization tests, field construction reports and construction specifications. The in-situ soils in the vicinity of the Waste Water Holding Pond typically consist of stiff to very stiff silty clays and clays, often with alternating laminations of silts and clays, with varying amounts of silts and fine sands and lignite beds. The more granular soils are generally present below the 260 foot elevation (NGVD) or about 9 feet below the bottom of the pond. Two field permeability tests were conducted, one each in Borings B-11 and B-12. The test in B-11 was performed 12 feet below grade and yielded a permeability of  $9.2 \times 10^{-8}$  cm/sec. The test in B-12 was performed 8 feet below grade and yielded a permeability of  $5.7 \times 10^{-7}$  cm/sec. Laboratory permeability test results range from  $1 \times 10^{-8}$  to  $9 \times 10^{-9}$  cm/sec for the cohesive soils encountered. No direct permeability data are available on the bottom and sides of the impoundment. In accordance with the regulations detailed in Section 7.3.7.I., UOP Inc. has instituted a ground water monitoring system. In addition, they propose a recovery well system to the south of the Pond. The monitoring and recovery systems will serve in lieu of pond retrofitting. This ground water monitoring system has been reviewed and approved by the state. The recovery system will be reviewed and approved by LDEQ prior to installation of the system. Details of the proposed recovery well system are presented in Appendix G for LDEQ's review and approval.

To the best of my personal knowledge, belief and professional judgment, with the installation of an approved recovery well system the Waste Water Holding Pond will meet the standards of the Louisiana Solid Waste Regulations.

  
John F. Grosch, III, P. E.

**APPENDIX H**  
**UOP**  
**SHREVEPORT, LOUISIANA**  
**GROUNDWATER MONITORING PROGRAM**

**including:**

**Appendix H-1**  
**Groundwater Monitoring Program Overview**

**Appendix H-2**  
**Groundwater Sampling and Analysis Plan**

**Appendix H-3**  
**Groundwater Statistical Evaluation Plan**

**Appendix H-4**  
**Monitor Well Plugging and Abandonment Plan**

**Appendix H-5**  
**Monitor Well Installation Plan**

## **Appendix H-1**

### **Groundwater Monitoring Program Overview**

**FINAL**

## **APPENDIX H-1**

# **GROUNDWATER MONITORING PROGRAM OVERVIEW NO. 1 POND**

*Prepared for*  
UOP  
Shreveport, Louisiana

April 11, 2007

File No. 19228153.00001



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## **1.0 INTRODUCTION**

UOP operates a catalyst manufacturing plant located near the town of Blanchard, approximately 10 miles northwest of Shreveport in Caddo Parish, northwestern Louisiana.

The purpose of this Groundwater Monitoring Program Overview is to provide the background, rationale and approach for monitoring groundwater for a Type I solid waste impoundment known as the No. 1 Waste Water Holding Pond at the UOP facility in north Louisiana. The rectilinear No. 1 Waste Water Holding Pond (No. 1 Pond) is located on the western side of the plant site. This 24 million gallon surface impoundment was created approximately 30 years ago by damming and subsequently rerouting an intermittent tributary of Choctaw Bayou, a creek draining south into Cross Lake.

This document provides the regulatory framework for the groundwater program in existence at the site and addresses the requirements of the new Louisiana Solid Waste Rules and Regulations promulgated in February, 1993, specifically the groundwater requirements under LAC 33:VII.521.F.5 and the associated standards under LAC 33:VII.709.E. This plan also incorporates comments dated January 10, 2006 and December 18, 2006 from the Louisiana Department of Environmental Quality (LDEQ) during the permit renewal process. Separate plans are included in this Appendix outlining the procedures for Groundwater Sampling and Analysis, Groundwater Statistical Evaluation, Plugging and Abandonment of Monitor Wells, and Monitor Well Installation.

## **2.0 FACILITY BACKGROUND**

### **2.1 History of Operation**

The plant generates a nonhazardous wastewater stream characterized by a high chloride content. Prior to 1987, the wastewaters generated were collected in a holding tank in the processing area and subsequently pumped to the wastewater holding pond about one-half mile removed from the processing area. Polymer was added to the wastewater as it was pumped to the holding pond to enhance precipitation of solids in the pond. The wastewater was then disposed by deep well injection in UOP's on-site permitted disposal wells. Settled solids in the pond were periodically removed and disposed of at a permitted facility as nonhazardous industrial waste.

In 1987, UOP completed the installation and startup of a wastewater treatment system (at a cost of approximately \$8 million) to recover and recycle up to 90 percent of the wastewater. The system consists of a dissolved air flotation (DAF) unit, a filtration system and an evaporation/condensing system. In 1992, this system was upgraded at a cost of approximately \$30 million.

The wastewater now goes directly from the collecting tank to the new treatment unit. Filtered solids are collected, dried, and placed in a dumpster for off-site disposal as nonhazardous industrial waste. The clarified water is then recovered by evaporation/condensation. Up to 90 percent of the 270 gpm process flow is recovered and reused as process water. The evaporator bottoms go directly to the disposal wells.

Since the startup of this new system, the wastewater holding pond is utilized only for temporary storage of wastewater in the event of upsets, wastewater treatment unit outages, disposal well outages and large rainfall surges. Water placed in the holding pond is subsequently pumped to the treatment unit.

## **2.2 Regulatory History**

UOP, in its initial Part A submittal to LDEQ, listed the No. 1 Pond as a Hazardous Waste Unit. It was later reclassified as a Solid Waste Unit based on sludge analyses and certification provided by UOP to LDEQ. During a meeting between UOP and LDEQ, UOP agreed to a request from the Ground Water Protection Division that all wells continue to be monitored for the hazardous waste parameters through Year Two because of concerns related to the hydraulic isolation of the pond from a second facility, the adjacent Closed Hazardous Waste Pile. (The facility has completed these requirements as of the date of permit modification). A copy of the LDEQ declassification letter is attached in Appendix H-1.A.

The No. 1 Pond is currently operated under a standard solid waste permit (Waste Permit P-0182).

Groundwater quality and piezometric data have been monitored in the vicinity of No. 1 Pond and the closed Waste Pile since the first four monitor wells were installed in 1980. This monitoring network was significantly upgraded in 1985 according to a Ground Water Sampling and Analysis Plan proposed by UOP in May 1985, and subsequently approved by LDEQ with some modifications. Much new information regarding groundwater and surface water quality and movement has been developed since that time through geophysical and aquifer pumping investigations.

The current Groundwater Monitoring Program followed from a review of the semiannual sampling data, sampling and analysis of the sludge and water in the pond, and discussions with LDEQ during the permitting process.

A discussion of the changes since the original program was implemented is given below:

### **May 1985 Ground Water Sampling and Analysis Plan**

Eight 3-inch diameter monitor wells (MWs 5, 6, 6A, 7, 7A, 8, 9 and 10) were installed in the vicinity of the No. 1 Pond and Closed Waste Pile, and two 2-inch diameter observation wells or piezometers (PWs 11 and 12) were emplaced east and west of the impoundment to fulfill the monitoring requirements of the May 1985 plan as modified by LDEQ. These wells supplement the four wells which predate this plan (MWs 1, 2, 3 and 4). The existing MW-2 well was determined to be suitable for continued use as the upgradient well in the expanded monitoring scheme. It should be noted that MWs 6A and 7A were wells screened in a shallow perched groundwater table prior to replacement to monitor the deeper water-bearing zone (40-Foot Zone) in which the remainder of the wells are screened.

UOP's monitoring wells (MWs 2, 5, 6, 6A, 7, 7A, 8, 9 and 10) were sampled in years one and two for the parameters shown in Table H-2.2 at the frequencies indicated, whether quarterly, semiannually, or annually. The amendments discussed below change the designation of some of the monitor wells and the frequency with which some parameters are analyzed, but do not alter the existing protocol for sample collection, measurement of water levels, sample preservation, shipment and analysis.

### **LDEQ Authorized Amendments to Existing Plan**

Changes reflected in the current Ground Water Monitoring Program arose out of discussion summarized in the correspondence between LDEQ and UOP in July and August 1987. This correspondence is included in Appendix H-1.A. Modifications authorized are as follows:

- **LDEQ Authorization 1.** Monitor Wells 6A and 7A are to be taken out of the groundwater monitoring system by plugging and abandonment procedures stipulated in Section 18.12 of the Louisiana Hazardous Waste Regulations (LHWR), and reported to the Department of Transportation and Development per the Water Well Rules and Regulations, November 1985.
- **LDEQ Authorization 2.** Monitor wells listed in Table 2 of the July 22, 1987 letter are to be sampled and analyzed per the parameters and frequency stated in that table. These wells will be regulated by the LHWR and have been designated as the monitoring system for the Closed Waste Pile. (Not applicable to the Solid Waste Permit for the No. 1 Pond).
- **LDEQ Authorization 3.** Monitor wells listed in Table 1 of the July 22, 1987 letter are to be sampled and analyzed per the parameters and frequency stated in that table. These wells are regulated by the Louisiana Solid Waste Rules and

Regulations (LSWRR), and have been designated as the monitoring system for the No. 1 Pond.

- **LDEQ Authorization 4.** UOP will install a new monitor well for the Closed Hazardous Waste Pile. (Not applicable to the Solid Waste Permit for the No. 1 Pond).
- **LDEQ Authorization 5.** Two observation wells (now designated as OW-14 and OW-15) were installed to monitor the effectiveness of the groundwater recovery system proposed in the UOP Inc. Solid Waste Permit Application.

### **UOP Implementation of LDEQ Authorized Amendments**

UOP has implemented Authorizations 1 through 5 described above. Monitor wells are being sampled and analyzed per the parameters and frequencies specified in the above referenced tables. It should be noted that MW-7 is included on both tables as it has been determined to monitor both the Closed Waste Pile and the No. 1 Pond. UOP also obtains field measurements of pH, specific conductance and temperature to assure that samples obtained are representative of groundwater outside well casings.

Two new 3-inch diameter observation wells were installed on October 14 and 15, 1987, and were designated OW-1 and OW-2. These wells monitor the effectiveness of the groundwater recovery system proposed in the UOP Solid Waste Permit Application as specified in Authorization 5. These wells have been renumbered under UOP's current monitoring program as OW-14 and OW-15.

### **Changes Related to the Permit Renewal Application**

The following changes were made to the groundwater monitoring program during the permit renewal process based on LDEQ comments to the permit application and discussions with LDEQ staff.

- A 2-inch diameter piezometer (designated PW-16) was installed on the north side of the pond for additional hydraulic control and will be monitored for water elevations only.
- Volatile organic constituents were removed from the groundwater monitoring list.

- Aluminum, chromium, copper, nickel, thallium and nitrate were added to the groundwater monitoring list
- A sample of the oil that is used in the process was collected and analyzed for TPH-DRO and TPH-ORO. The results, which are presented in Appendix H-1.B, indicate that the oil is predominantly in the diesel range (C10 to C28). Therefore, TPH-DRO was added to the groundwater monitoring list.

These changes have been incorporated into the groundwater monitoring program.

### **3.0 HYDROGEOLOGIC SETTING**

The hydrogeology of the area of the No. 1 Pond has been defined by Dames and Moore (1980) and Woodward-Clyde Consultants (1987).

#### **3.1 Hydrogeologic Units**

The Perched Zone and the 40-Foot Zone are water-bearing zones. The clay zones have very low hydraulic conductivities and are not considered to be water-bearing zones.

The uppermost clay zone extends from the ground surface to 15 to 25 feet bls. The vertical hydraulic conductivity of the uppermost clay zone was determined to be  $2.0 \times 10^{-8}$  cm/sec ( $2.83 \times 10^{-5}$  ft/day) by laboratory testing by Dames and Moore (1980). The clay zone does not yield groundwater.

Groundwater occurs within the Perched Zone (WCC, 1987). The water table may fluctuate seasonally within this zone. The Perched Zone is laterally discontinuous in the area of the waste management units. It is in contact with the 40-Foot Zone where the underlying clay is absent. The average transmissivity of the Perched Zone was determined to be 120 gallons per day per foot (gpd/ft) or 16 feet squared per day (ft<sup>2</sup>/day) by a pumping test conducted in monitoring well MW-6A in June 1987 (WCC, 1987). Based on a thickness of approximately 10 feet, the hydraulic conductivity of the Perched Zone is approximately 1.6 ft/day. The average storage coefficient determined from the pumping test is 0.0014.

The hydraulic properties of the clay underlying the Perched Zone have not been determined. The Perched Zone and the 40-Foot Zone are in hydraulic communication where this clay is absent, as shown by the pumping tests conducted in the Perched Zone and in the 40-Foot Zone in June 1987 (WCC, 1987).

The 40-Foot Zone is laterally continuous in the area of the waste management units. The 40-Foot Zone is water-bearing and is confined by the overlying and underlying clay. Water levels in the 40-Foot Zone are generally 2 to 3 feet lower than water levels in the Perched Zone. Slug tests were performed on MW-5, MW-7, and MW-10, which are screened in the 40-foot zone. Slug test data obtained in September 1985 indicate average hydraulic conductivity for the wells in the 40-Foot Zone of about  $2 \times 10^{-5}$  ft/sec.

The Wilcox Group is the only aquifer in the area of the facility. Freshwater-bearing aquifer sands occur at depths between 110 and 160 feet bls in the area of the waste management units and at depths of 80 to 90 feet bls and 120 to 140 feet bls elsewhere in the plant property.

### **3.2 Area Monitoring Well Network**

Seventeen monitoring wells are located within the No. 1 Pond Area and the Closed Hazardous Waste Pile. Five monitoring wells (MW-2, MW-5, MW-6, MW-7, and MW-12) are for monitoring the No. 1 Pond. Five wells (MW-7, MW-8, MW-9, MW-10, and PW-13R) are for monitoring the Closed Hazardous Waste Pile and are therefore not considered part of the groundwater monitoring program for the No. 1 Pond solid waste permit. (NOTE: MW-7 monitors both the Waste Pile and the No. 1 Pond.) Three observation wells (OW-3, OW-14, and OW-15) are for monitoring chlorides and water levels. All of these wells are sampled semiannually. Four piezometers (PW-1, PW-4, PW-11 and PW-16) are used for measuring groundwater levels only. Monitoring well MW-13 was removed from the Closed Hazardous Waste Pile Monitoring Program and is now only used for water elevations.

Section 5.1 discusses the groundwater monitoring network for the No. 1 Pond in more detail.

### **3.3 Groundwater Flow Patterns and Rates**

Groundwater flow patterns and flow rates (average linear velocities) have been determined in the 40-Foot Zone in the area of the waste management units from the distribution of water levels in monitoring wells and from the hydraulic conductivity determined from the pumping test.

The groundwater flow rate in the monitored zone is estimated to be approximately 24 to 28 feet per year based on the recent (June 2006 and October 2006) sampling events. The estimated flow rate was calculated using the equation:

$$V = Ki/e$$

Where:

- V = Linear velocity
- K = Hydraulic conductivity
- i = Hydraulic gradient
- e = effective porosity

Hydraulic conductivity (K) values obtained from slug tests conducted in September 1985, ranged from a maximum of  $2.74 \times 10^{-5}$  feet per second (ft/sec) to a minimum of  $1.36 \times 10^{-5}$  ft/sec. The value used for K is the arithmetic mean of the measurements ( $2.0 \times 10^{-5}$  ft/sec). An average hydraulic gradient (i) values of 0.011 for June 2006 and 0.013 for October 2006 was estimated based on the potentiometric maps. An effective porosity (e) value of 30 percent was used based on fine silty sand as the dominant stratigraphic unit of the monitoring zone.

Water levels in the Perched Zone are higher than water levels in the 40-Foot Zone, indicating a component of downward groundwater flow.

#### **4.0 CURRENT CONDITIONS**

UOP has monitored groundwater conditions since 1980 at the Shreveport plant. This section describes the occurrence of constituents in groundwater in the vicinity of the No. 1 Pond.

##### **4.1 Previous Assessment Results**

Elevated concentrations of chloride occur in groundwater downgradient of the No. 1 Pond. Figure H-1.1 shows the distribution of chloride concentrations in the 40-Foot Zone in the vicinity of the No. 1 Pond in October 2006. The area of elevated chloride concentration extends southward 600 feet from the south side of the No. 1 Pond. The chloride-affected area is approximately 800 feet wide. The highest chloride concentrations were detected in monitoring well MW-5 and MW-6 at 3,650 mg/l and 2,590 mg/l, respectively. Chloride concentrations in all other wells were below 350 mg/l. Four recovery wells are being used to withdraw chloride-bearing groundwater from the 40-Foot Zone.

##### **4.2 Implementation of Corrective Measures**

Corrective measures are currently in operation for recovery of chlorides from the 40-Foot Zone groundwater of the No. 1 Pond Area. Based on the results of ongoing groundwater monitoring, no releases have occurred from the Closed Hazardous Waste Pile; therefore, the chloride recovery program is directed exclusively to recovery of chlorides released from the No. 1 Pond.

The primary objective of the No. 1 Pond chloride recovery operation is to control the horizontal migration of chlorides from the No. 1 Pond by intercepting the groundwater flow of the 40-Foot Zone. To meet this objective, UOP has installed a chloride recovery well system consisting of four recovery wells (RW-1, RW-2, RW-3, and RW-4) located on an east-west line about 250 feet south of the southern edge of the pond. The wells are spaced approximately 150 to 250 feet apart, and they are screened at approximately 40 to 50 feet below the ground surface in the 40-Foot Zone. The approximate locations of the recovery wells are shown in Figure H-2.1 (Appendix H-2).

The chloride recovery wells discharge into a common underground pipe, which transports the recovered groundwater to an aboveground storage tank located within the confines of the northwest corner of the No. 1 Pond. The water received into the storage tank overflows from the top of the tank into the No. 1 Pond. The water in the No. 1 Pond is pumped via underground pipeline to the main plant recycle-water facility for recovery or is sent to the injection wells for disposal.

Operation of the chloride recovery system began in August 1991. The recovery operation is monitored by three observation wells (OW-3, OW-14, and OW-15) located about 250 feet south (downgradient) of the chloride recovery wells. These wells are dedicated to monitoring chlorides. The dedicated chloride observation wells are supplemented by selected monitoring wells from the No. 1 Pond and Closed Hazardous Waste Pile groundwater monitoring programs (MW-5, MW-6, MW-7, MW-8, and MW-9) located to the south of the No. 1 Pond. These wells monitor chlorides, along with other parameters specified in the No. 1 Pond operating permit and the Closed Hazardous Waste Pile post-closure permit. Piezometers are also used around the area of the pond to aid in evaluating hydraulic effects of the recovery system.

#### **4.3 Current Groundwater Program Regulatory Status**

The No. 1 Pond is currently under a corrective action monitoring program which was in existence prior to February, 1993. The corrective action plans, agreements and programs authorized by LDEQ and summarized herein will continue through the corrective action period. Following the corrective action period, the facility will revert to a detection monitoring program, unless other actions and programs are agreed to between UOP and LDEQ.

The elements of the groundwater monitoring system are described in the following section.

## **5.0 NO. 1 POND GROUNDWATER MONITORING SYSTEM**

### **5.1 Existing Monitor Well and Piezometer System**

As discussed above, the groundwater monitoring system for the No. 1 Waste Water Holding Pond consists of five groundwater monitoring wells (MW-2, MW-5, MW-6, MW-7, and MW-12), four recovery wells (RW-1 through RW-4), three observation wells (OW-3, OW-14, and OW-15), and four piezometers (PW-1, PW-4, PW-11 and PW-16). The locations of the wells and piezometers are shown in Figure H-2.1.

All wells and piezometers are completed in the 40-Foot Zone and yield sufficient quantities of water for evaluating groundwater passing beneath the vicinity.

The monitor wells will be sampled for assessing groundwater quality in the vicinity of the No. 1 Pond. All monitor wells will be sampled semiannually for the parameters shown in the Groundwater Sampling and Analysis Plan, Table H-2.3. MW-2 is the designated upgradient well which provides background water quality while the downgradient wells assess the quality of groundwater passing beneath the pond. All other wells, piezometers and observation wells are located downgradient to the No. 1 Pond.

The recovery wells (RW-1 through RW-4) are located in an east-west line downgradient from the No. 1 Pond in the area of elevated chlorides and recover groundwater from the 40-Foot Zone. High/low float level switches inside the well casings maintain a groundwater drawdown between elevations 241 and 243 msl. Data on water levels and chloride concentrations will be collected from the recovery wells on a semiannual basis.

The observation wells are located downgradient of the recovery wells in an east-west line to assess the effectiveness of the groundwater recovery wells. The assessment consists of semiannual water level measurements and collection of samples for chloride concentrations, similar to the recovery wells.

The piezometers provide information on water levels in the area.

#### **Post Corrective Action Monitoring System**

Following the corrective action monitoring period, the monitoring system will revert to detection monitoring program. The program will consist of semiannual sampling of the monitor wells for the parameters shown in Table H-2.2.

## **5.2 Monitor Well Construction**

The well construction details for the above wells and piezometers are summarized in the Groundwater Sampling and Analysis Plan, Table H-2.1, in accordance with LAC:33.VII.521.F.5. Monitor well, piezometer and recovery well as-builts are provided in Appendix E of the solid waste permit application.

## **5.3 Point of Compliance**

The relevant point of compliance is defined vertically and horizontally using various factors as outlined in the solid waste regulations. The horizontal limit of compliance is defined as an imaginary line connecting the well risers of downgradient wells MW-5, MW-6, MW-7 and MW-12. The vertical limit of compliance is the base of the groundwater zone being monitored by these wells, the 40-Foot Zone.

The groundwater program is an LDEQ-approved corrective action program which was in effect prior to the new solid waste regulations. Assessment and studies of corrective action remedies have been completed previously with concurrence by LDEQ. The assessment and corrective measures studies which are required for statistical exceedances at the point of compliance will therefore not apply during the corrective action period. Following the corrective action period and conversion to a detection monitoring program, the regulatory requirements for the compliance point wells will apply.

## **6.0 GROUNDWATER SAMPLING AND ANALYSIS**

The procedures for water level measurement, purging and sampling, sample collection and containers, sample preservation, handling and transfers are covered in detail in the Groundwater Sampling and Analysis Plan in Appendix H-2. The Groundwater Sampling and Analysis Plan also stipulates the laboratory analytical methods to be employed on the samples, practical quantitation limits for each method, and quality assurance/quality control measures for precision and accuracy of sample, blank and spike analyses.

## **7.0 STATISTICAL EVALUATION OF GROUNDWATER DATA**

Statistical procedures for evaluating monitoring data after the effective date of the permit are presented in the Groundwater Statistical Evaluation Plan in Appendix H-3.

These methods are in accordance with procedures established in the U.S. EPA guidance document entitled Guidance Document on the Statistical Analysis of Groundwater Monitoring

Data at RCRA Facilities and the June, 1992 Addendum to the Interim Final Guidance, as well as the February, 1992 Louisiana Solid Waste Regulations.

The statistical methodology to be employed for the subject facility has been selected as being appropriate for the current groundwater recovery program in effect at the site and is known to be acceptable to EPA. The procedure will utilize the calculation of a confidence interval for mean constituent concentrations for each well and comparison of the upper confidence interval of the mean to certain Groundwater Protection Standards (GWPS). The GWPS are based on the Louisiana Risk Evaluation Corrective Action Program (RECAP) Screening Standards. For constituents without Screening Standards, the secondary federal drinking water Maximum Contaminant Levels (MCLs) are used. GWPS were not established for sodium, turbidity, total dissolved solids, pH or specific conductance because these are parameters to evaluate general water quality. UOP may propose to modify the GWPS using the RECAP Methodology and one of the RECAP management options. With LDEQ approval, these modified RECAP Standards would be incorporated into this GSEP.

Basically, the confidence interval method will consist of calculating a confidence interval about the mean for each well using the mean of the last (most recent) 4 observations. If the upper confidence limit is above the GWPS groundwater remediation will continue. If a log base scale of the data is used, the limits will be compared to the log of the GWPS. Alternatively, UOP may continue groundwater remediation based on inspection of the results without calculating confidence intervals. Once the GWPS is attained for all parameters at all wells for a period of three years, the groundwater recovery system will be allowed to discontinue. If the facility has not been clean-closed by this time, then the facility will revert to a detection monitoring program.

During the detection monitoring period, the facility will continue the use of the confidence interval approach described above. For each well, the upper and lower confidence limits will be calculated for each parameter using the mean values of the last four sampling events. In the event that the lower confidence limit is above the GWPS of any parameter in any well, this will be deemed statistical evidence of a release.

In the event of a significant statistical change during detection monitoring, LDEQ will be notified in accordance with LAC 33:I.Subpart 2. A written report will be sent to LDEQ within 14 days after the determination which identifies the parameter(s) causing the statistical exceedance. Within 90 days after the determination, UOP will either initiate an assessment monitoring program or submit a report to LDEQ demonstrating the change is due to causes other than an actual release. Confirmation of a significant change will indicate the need to conduct an assessment monitoring program as specified in LAC:VII.709.E.4 or to reestablish the groundwater recovery program.

## **8.0 REPORTING REQUIREMENTS**

Three bound copies of a report summarizing the results from the initial and all subsequent sampling events will be due within 90 days after completing semiannual sampling activities. The reports will include the following:

- Chain-of-custody documents.
- Potentiometric maps for the 40-foot zone.
- Analytical results.
- Chloride isoconcentration maps.
- Following the corrective action period and conversion to a detection monitoring program, statistical evaluations and a statement of whether a statistically significant difference in concentrations over GWPS will be conducted.

As stated earlier, evidence of statistically significant change during detection monitoring requires early notification to LDEQ to be followed by a written report in 14 days stating the parameters of concern. A 90-day report demonstrating the cause of the exceedance is required if reasons other than a release from the facility are believed to have occurred.

The annual report will also include a tabulation of the recovery well pumping data and an assessment of the effectiveness of the corrective action program.

## **9.0 MONITOR WELL, OBSERVATION WELL, PIEZOMETER AND RECOVERY WELL MAINTENANCE**

A monitor well, observation well, piezometer and recovery well maintenance program will be implemented to ensure well integrity. Each well will be reviewed periodically to check for damage or potential problems. A form or checklist similar to that attached as an exhibit in the Groundwater Sampling and Analysis Plan may be used for this purpose. Major improvements affecting well construction will require LDEQ approval.

Recovery wells should be checked on a regular basis to assure proper operations and to avoid major problems. Indications of a problem may be signaled by low recovery volumes recorded on the flowmeters. The operation of the float controls can be checked against the original design settings by measuring water levels in the recovery wells on a regular basis. Check valves are designed to prevent water from flowing backward into the wells after pumping has stopped and should be checked frequently to assure they are working properly. The buildup of slime and sediment is expected over time and major repairs may be avoided by periodic inspection and cleaning of the pumps and possibly redevelopment of the well casing if necessary.

## **10.0 INSTALLATION OF NEW MONITOR WELLS, OBSERVATION WELLS OR PIEZOMETERS**

Procedures for installation of new monitor wells, observation wells or piezometers constructed after the effective date of this permit are described in Appendix H-5, Monitor Well Installation Plan. The Monitor Well Installation Plan has been prepared in accordance with LAC 33:VII.709.E.1(c) and (d).

## **11.0 PLUGGING AND ABANDONMENT OF MONITOR WELLS, OBSERVATION WELLS, RECOVERY WELLS AND PIEZOMETERS**

A Monitor Well Plug and Abandonment Plan is provided in Appendix H-4 which describes the procedures to be followed to plug and abandon monitor wells, consistent with the requirements of LAC 33:VII.709.E.1(c).

The primary method of plugging and abandonment will be to remove the well materials from the original borehole and surface and tremie a cement-bentonite grout full depth from the bottom of the well to the surface. If this is not possible, the well will be plugged and abandoned by installation of cement-bentonite grout inside the well's casing from the bottom of the well to the surface.

## **12.0 REFERENCES**

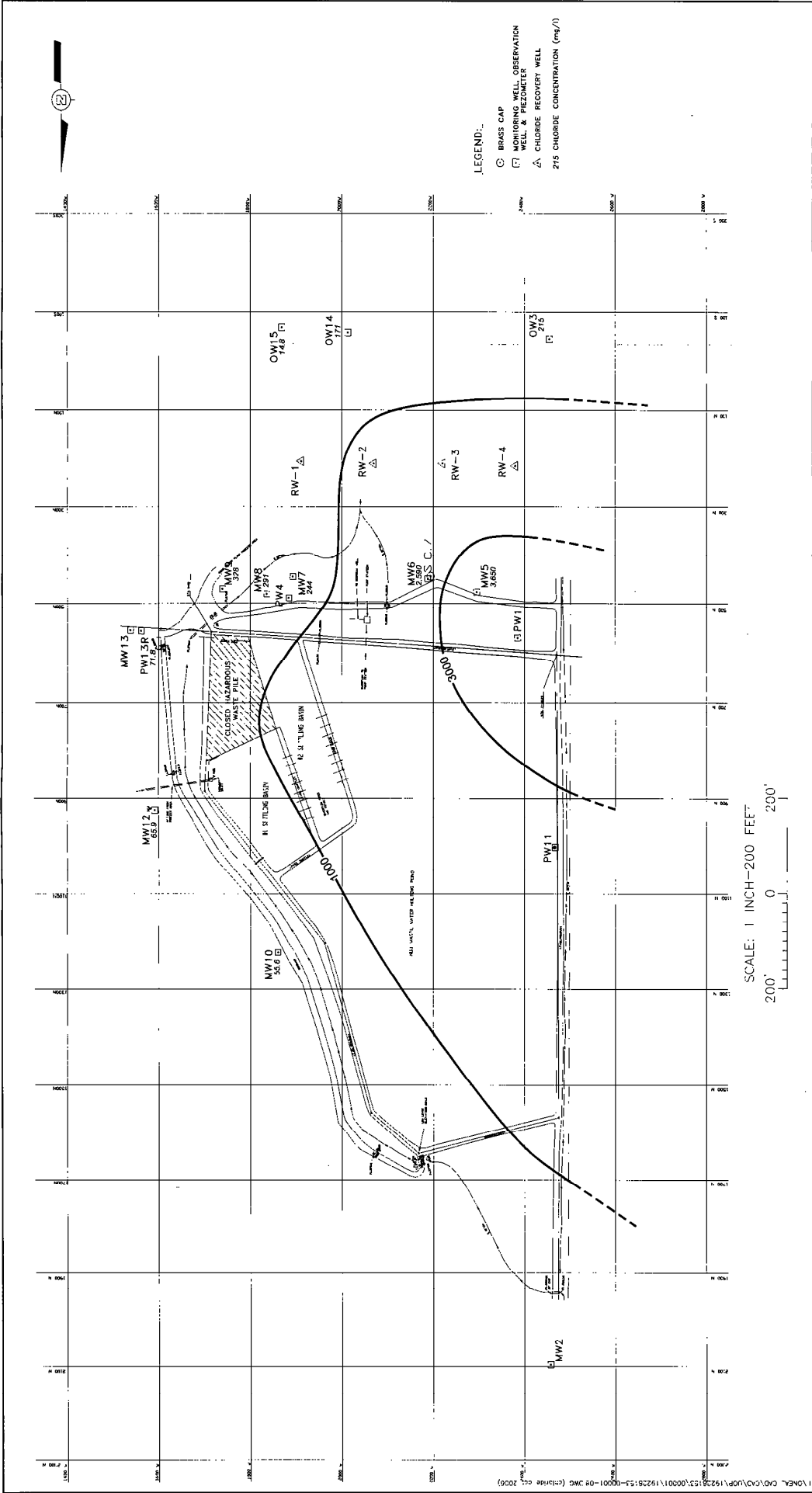
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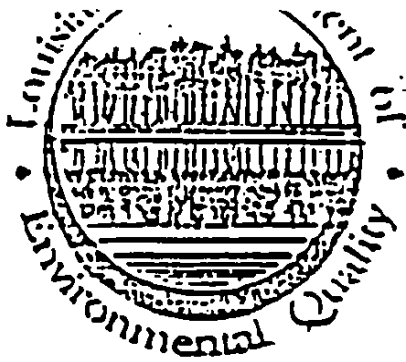
Woodward-Clyde Consultants. 1993. First Semiannual Groundwater Monitoring Report 1993, No. 1 Pond, UOP Shreveport Plant.

## FIGURES



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**APPENDIX H-1.A**  
**LDEQ CORRESPONDENCE**



PATRICIA L. NORTON  
SECRETARY

OFFICE OF SOLID AND HAZARDOUS WASTE

JOHN KOURY  
ASSISTANT SECRETARY

October 11, 1985

Mr. Richard A. Llorens  
Technical Assistant to Director of Mfg.  
UOP Process Division (LAD057109449)  
Post Office Box 21566  
Shreveport, Louisiana 71120

Dear Mr. Llorens:

RE: Surface Impoundment Reclassification

This letter is to formally advise you that based on the test results submitted and on your certification letter dated April 3, 1985, this Division concurs that the subject impoundment is not a hazardous waste unit and therefore not subject to the State's Hazardous Waste Regulations.

The impoundment is subject to the State's Solid Waste Regulations however, and you should immediately advise the Solid Waste Division on the status of this unit.

Sincerely,

  
GLENN A. MILLER  
Administrator

GAM:DJD:pgw

cc: George H. Cramer II  
Joan L. Albritton  
Jack Daggett  
Tom Patterson  
B. Delatte, SWD



Process Division

PO Box 21566 • Shreveport, Louisiana 71120  
Telephone 338-929-3521 • TWX 510-974-4430

August 3, 1987

Mr. George Cramer  
Groundwater Protection Division  
Department of Environmental Quality  
State of Louisiana  
Post Office Box 44066  
625 North Fourth Street  
Baton Rouge, Louisiana 70804

RECEIVED BY  
AUG 04 1987  
GROUND WATER  
PROTECTION DIVISION

Dear Mr. Cramer:

Attached is a copy of the meeting notes from July 8, 1987, between UOP Inc., Woodward-Clyde Consultants, and Louisiana Department of Environmental Quality - Groundwater Protection personnel. These notes were prepared by Woodward-Clyde Consultants. The purpose of the meeting was to determine the necessary parameters for groundwater monitoring of the Closed Hazardous Waste Pile and the Industrial Wastewater Holding Pond at the UOP Inc. Shreveport Plant.

As long as you concur with the meeting notes, please send us a confirmation letter stating that the following items will be a requirement of your department:

1. Monitor wells 6A and 7A are to be taken out of the groundwater monitoring systems.
2. Monitor wells listed in Table 2 are to be sampled and analyzed per the parameters and frequency stated in Table 2. Table 2 wells will be regulated by the Louisiana Hazardous Waste Regulations.
3. Monitor wells listed in Table 1 are to be sampled and analyzed per the parameters and frequency stated in Table 1. Table 1 wells will be regulated by the Louisiana Solid Waste Regulations.
4. UOP will install a new monitor well for the Closed Hazardous Waste Pile.

G. Cramer  
August 3, 1987  
Page Two

5. Two observation wells will be installed to monitor the effectiveness of the groundwater recovery system proposed in the UOP Inc. Solid Waste Permit Application.

Please contact me if there are any further questions on this subject.

Sincerely,



Mark Puett  
Environmental Engineer

MLP/ajc

Emery Airbill #026627759

xc: D. Dhamotharan  
Woodward-Clyde Consultants

July 22, 1987

Mr. Mark Puett  
UOP, Inc.  
State Highway 533 North  
P. O. Box 21566  
Shreveport, Louisiana 71120

Re: Minutes of LDEQ July 8, 1987 Meeting  
Concerning Monitoring Parameters  
File S7B166C-B

Dear Mr. Puett:

Submitted herewith are minutes of the July 8, 1987 meeting with Louisiana Department of Environmental Quality (LDEQ) concerning a formal request by UOP on February 19, 1986 to have the monitoring wells at the Solid Waste facility - Waste Water Holding pond released from the Louisiana Hazardous Waste Regulation Program to the Solid Waste Regulation Program. The following personnel were present at the meeting.

Marvin E. Brossette	UOP
Mark L. Puett	UOP
Dhano S. Dhamotharan	WCC
C. Winston Russell	WCC
George Cramer	LDEQ
Tom Isaacs	LDEQ
Maurice Lasserre	LDEQ



Mr. Mark Puett  
July 22, 1987  
Page 2

Dr. Dhamotharan opened the meeting by explaining that UOP had formally requested in their letter of February 19, 1986 that the monitoring wells MW-2, MW-5, MW-6, MW-6A and MW-7A be released from the Hazardous Waste Program and that the monitoring parameters be changed. These wells, together with Monitor Well MW-7 which also monitors the Closed Hazardous Waste Pile, monitor the Waste Water Holding Pond Solid Waste facility. He suggested that the Waste Water Holding Pond be monitored for the indicator parameters pH, total dissolved solids, specific conductivity, hardness, plus site specific parameters chloride, sulfate, barium and sodium.

LDEQ requested that turbidity be analyzed instead of hardness in all these wells and two wells, MW-6 and MW-7, be analyzed annually for purgeable volatile organics. Per LDEQ's request, temporary piezometer No. 12 has been converted to monitoring well. At LDEQ's suggestion, it has been agreed that MW-6A and MW-7A in the perched water table be taken out of the monitoring well system. Table 1 lists the monitoring wells to be sampled, the sampling frequency, and the parameters to be analyzed for the Waste Water Holding Pond.

Mr. Mark Puett  
 July 22, 1987  
 Page 3

TABLE 1  
 MONITORING WELLS, PARAMETERS AND SAMPLING  
 FREQUENCY FOR WASTE WATER HOLDING POND

<u>Parameter</u>	<u>MW-2</u>	<u>MW-5</u>	<u>MW-6</u>	<u>MW-7</u>	<u>MW-12</u>
pH	S	S	S	S	S
Total Dissolved Solids	S	S	S	S	S
Specific Conductance	S	S	S	S	S
Turbidity	S	S	S	S	S
Chloride	S	S	S	S	S
Sulfate	S	S	S	S	S
Barium	S	S	S	S	S
Sodium	S	S	S	S	S
Volatile Organics			A	A	

S - Semi-annual analysis

A - Annual analysis

The representatives of LDEQ reviewed the locations of the monitoring wells for the Closed Hazardous Waste Pile. After some discussion of the locations of the wells for the facility and the current analytical parameters, LDEQ requested and UOP agreed to add one new well on the southeast side of the closed waste pile. LDEQ suggested that the parameters total organic halogen and total organic carbon be deleted from the list of monitoring parameters. Instead of these two parameters, volatile organics will be analyzed annually in all of these wells.

Table 2 lists the wells that will monitor the Closed Hazardous Waste Pile, the sampling frequency, and the parameters to be analyzed in these wells.

Mr. Mark Puett  
 July 22, 1987  
 Page 4

TABLE 2  
 MONITORING WELLS, PARAMETERS AND SAMPLING  
 FREQUENCY FOR CLOSED HAZARDOUS WASTE PILE

<u>Parameter</u>	<u>MW-7</u>	<u>MW-8</u>	<u>MW-9</u>	<u>MW-10</u>	<u>New Well</u>
pH	S	S	S	S	S
Specific Conductance	S	S	S	S	S
Chloride	A	A	A	A	A
Iron	A	A	A	A	A
Phenols	A	A	A	A	A
Sulfate	A	A	A	A	A
Manganese	A	A	A	A	A
Sodium	A	A	A	A	A
Volatile Organics	A	A	A	A	A

S - Semi-annual analysis

A - Annual analysis

The recovery well system for the Waste Water Holding Pond was briefly discussed and UOP informed LDEQ of their plans to install two observation wells downgradient of the existing monitoring well array. The purpose of these wells is to confirm the results of the geophysical survey prior to installing the recovery wells. LDEQ representatives agreed that it would be prudent for UOP to install the temporary observation wells.

Mr. Mark Puett  
July 22, 1957  
Page 5

We appreciate the opportunity to be of service to UOP. If you have any questions,  
please feel free to call.

Very truly yours,

  
C. Winston Russell


  
Dhamo S. Dhamotharan, Ph. D., P. E.  
CWR:gh

TABLE 3

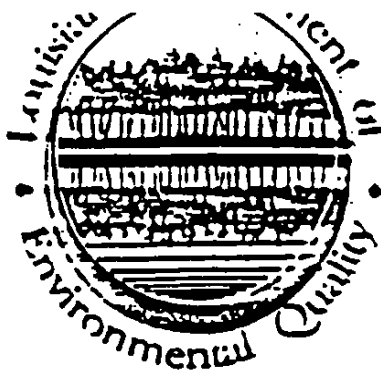
**YEAR THREE**  
**MONITORING WELLS, PARAMETERS AND SAMPLING FREQUENCY**  
**FOR WASTE WATER HOLDING POND**

<u>Parameter</u>	<u>MW-2</u>	<u>MW-5</u>	<u>MW-6</u>	<u>MW-7</u>	<u>MW-12</u>
pH	S	S	S	S	S
Total Dissolved Solids	S	S	S	S	S
Specific Conductance	S	S	S	S	S
Turbidity	S	S	S	S	S
Chloride	S	S	S	S	S
Sulfate	S	S	S	S	S
Barium	S	S	S	S	S
Sodium	S	S	S	S	S
Volatile organics			A	A	

S = Semiannual analysis

A = Annual analysis

VBC, MEB, WAD, MUF  
S PLAINES: YOS, FYG  
(C) D. CHAMOTHARAN, D-DEYCEE



RECEIVED

AUG 20 1987

W

THA A. MADDEN  
SECRETARY

OFFICE OF SOLID AND HAZARDOUS WASTE

JOHN KOURY  
ASSISTANT SECRETARY

August 11, 1987

Mark Puett  
Environmental Engineer  
UOP Process Division  
Post Office Box 21566  
Shreveport, Louisiana 71120

Dear Mr. Puett:

RE: Modification to the Ground Water Program

Per our meeting of July 8, 1987, and your correspondence of August 3, 1987, the following changes to the ground water monitoring program will be required, and are hereby authorized to be implemented.

1. Monitor wells 6A and 7A are to be taken out of the ground water monitoring system by plugging and abandonment procedures stipulated in Section 13.12 of the Louisiana Hazardous Waste Regulations (LHWR), and reported to Department of Transportation and Development per the Water Well Rules and Regulations, November 1985.
2. Monitor wells listed in Table 2 are to be sampled and analyzed per the parameters and frequency stated in Table 2. Table 2 wells will be regulated by the LHWR.
3. Monitor wells listed in Table 1 are to be sampled and analyzed per the parameters and frequency stated in Table 1. Table 1 wells will be regulated by the Louisiana Solid Waste Regulations.
4. UOP will install a new monitor well for the Closed Hazardous Waste Pile.
5. Two observation wells will be installed to monitor the effectiveness of the ground water recovery system proposed in the UOP Inc. Solid Waste Permit Application.

Mark Puett  
Page Two  
August 11, 1987

We appreciate UOP's continued attention to these matters and should you have any questions, please contact us.

Sincerely,

*Narendra M. Law*  
for GEORGE H. CRAMER, II  
Administrator

GHC:LML:cer

November 23, 1987

Louisiana Department of Transportation and Development  
P. O. Box 94245  
Baton Rouge, Louisiana 70804-9245

Attention: Chief - Water Resources Section

Re: Monitoring Well Registration  
UOP Inc.  
Blanchard, Louisiana  
File 87B166C-C


Gentlemen:

Transmitted with this letter are three well registration short forms (DOTD-GW-1S) for two monitoring wells which were installed by our company and six water well plugging and abandonment forms (DOTD-GW-2) for the temporary wells which were abandoned at the UOP Inc. plant. These wells were located near Waste Water Holding Pond No. 1 located inside the plant.

If you have any questions, please feel free to call.

Very truly yours,

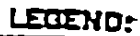
  
Manouchehr Fakhroo, P. E.

  
V. E. Sendukas, P. E.

MF:cts  
Enclosures

cc Mr. Mark L. Puett (UOP), w/enclosures  
Mr. Dudley J. Deville (WCC), w/enclosures





- NOTE:**

MONITOR WELL INSTALLATION AND  
PLUGGING OF OBSERVATION WELL

(NOT TO SCALE)

FILE: 878166C-C  
NOVEMBER, 1987

April 27, 1988

Louisiana Department of Transportation and Development  
P. O. Box 94245  
Baton Rouge, Louisiana 70804-9245

Attention: Chief - Water Resources Section

Re: Monitoring Well - Renumbering  
UOP Inc.  
Blanchard, Louisiana  
File 38B157C

Gentlemen:

On November 23, 1987, Woodward-Clyde Consultants (WCC) sent your three well registration short forms (DOTD D-GW-15) for monitoring wells installed by our company for UOP Inc. Upon incorporating these wells into UOP's current monitoring program they have been renumbered as presented below:

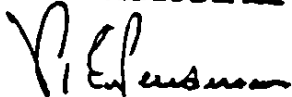
<u>Old Number</u>	<u>New Number</u>
MW-11	MW-13
OW-1	OW-14
OW-2	OW-15

If you have any questions, please feel free to call.

Very truly yours,



Charles B. Dartez



V. E. Sendukas, P. E.

CBD:cfs



**APPENDIX H-1.B**  
**OIL ANALYTICAL RESULTS**



**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
Saint Rose, LA 70087

Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

March 22, 2007

Willie Beal  
URS Corporation  
7389 Florida Blvd.  
Suite 300  
Baton Rouge, LA 70809

RE: Project: 2067591  
RE: Project ID: UOP HSWA

Dear Willie Beal:

Enclosed are the analytical results for sample(s) received by the laboratory on March 14, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Cindy Olavesen



**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006



# Report of Laboratory Analysis

## Project Number: 2067591





## Sample Cross Reference Report

**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

Client: URS Corporation

Project: UOP HSWA

Project No.: 2067591

Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
UOP-FORMING OIL	20507511	Other	03/06/2007 14:30	03/14/2007 15:22

3/22/2007 15:56:15

New Orleans Laboratory Certifications  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0661  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (NELAC) - E87595  
Kansas Dept. of Health, Environment - E-10266  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Project Narrative

**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

---

**Project: 2067591**

---

**Sample Receipt Condition:**

All samples were received in accordance with EPA protocol.

**Holding Times:**

All holding times were met.

**Blanks:**

All blank results were below reporting limits.

**Laboratory Control Samples:**

All LCS recoveries were within QC limits

**Matrix Spikes and Duplicates:**

All MS/MSD recoveries or duplicate RPDs were within QC limits

**Surrogates:**

Surrogate recoveries outside of QC limits are qualified in the surrogate results section.

**Regulatory, Permit or Client Specified Limits:**

Results were found that exceeded regulatory, permit or client specified limits:

Method EPA 8015 Mod Ext sample 20507511 Diesel Range Organics (C10-28) result 929000mg/kg is greater than 65mg/kg limit

Method EPA 8015 Mod Ext sample 20507511 Oil Range Organics (>C28-40) result 201000mg/kg is greater than 180mg/kg limit

---

3/22/2007 15:56:43

**New Orleans Laboratory Certifications**  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (FELAC) - E87595  
Kansas Dept. of Health, Environment - E-10265  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Project Narrative

**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

Project: 2067591

Analytical Method	Batch	Sample used for QC
EPA 8015 Mod Ext	83587	Batch sample from another client

3/22/2007 15:56:46

For the sample used as the original for the DUP or MS/MSD for the batch:

Project sample means a sample from this project was used.

Client sample means a sample from the same client but in a different project was used.

Batch sample means a sample from the a different client was used.

**New Orleans Laboratory Certifications**  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (NELAC) - E87595  
Kansas Dept. of Health Environment - E-10266  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Report of Laboratory Analysis

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

Client: URS Corporation

Client ID: UOP-FORMING OIL

Site: None

Project: UOP HISWA

Project No.: 2067591

Sample Qu:

Lab ID: 20507511

Matrix: Other

% Moisture: n/a

Description: None

Prep Level: Other

Batch: 83587

Method: 8015 TPH Extractables Soil

Units: mg/kg

Target List: TPH SL20

Collected: 03/06/07

Received: 03/14/07

Prep Factor: 1

Prepared: 03/19/07

Analyzed: 03/20/07 13:47 SPPL(1)

CAS Number	Parameter	Dilution	Result	Qu	Adjusted MDL	Reporting Limit	Reg. Limit
	Diesel Range Organics (C10-28)	50	929000	D1,P2,P5	5530	25000	65.0
	Oil Range Organics (>C28-40)	50	201000	D1,P2,P5	31300	125000	180.

2 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.  
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.  
Reporting Limit is corrected for sample size, dilution and moisture content if applicable.  
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.  
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.  
Regulatory Limit denotes an actual regulatory limit or a client-requested modification limit.  
Analysis performed in (1) New Orleans, (2) Baton Rouge, (3) Bossier City, (4) Houston, or (5) subcontract or field.

New Orleans Laboratory Certifications  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (NELAC) - E87595  
Kansas Dept. of Health, Environment - E-10265  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270

3/22/2007 15:56 49



## Report of Quality Control

Pace Analytical Services, Inc.

1000 Riverbend Blvd. Suite F

St. Rose, LA 70087

Phone: 504.469.0333

Fax: 504.469.0555

LELAP # 02006

Method: EPA 8015 Mod Ext

Project: 2067591

LCS: 20508187 3/19/2007 8:07:00 PM

Batch: 83587

MS:

Units: mg/kg

Original for MS:

Parameter Name	LCS Spike	LCS Found	L.CSD Found	LCS %Rec	L.CSD %Rec	LCS RPD	MS Spike	Sample Found	MS Found	MSD Found	MS %Rec	MSD %Rec	(1)MS RPD	QC Limits LCS	Max MS/MSD	Qu RPD
Diesel Range Organics (CI)	400	348.9		87										55 - 140	-	
1 compound(s) reported																

\* denotes recovery outside of QC limits.

MS spike concentrations are not corrected for moisture content of the spiked sample.

(1) MS RPD is calculated via SW-846 rules; on the basis of spiked sample concentrations rather than spike recoveries.

3/22/2007 15:56:52

New Orleans Laboratory Certifications

Louisiana Dept. of Environmental Quality (LELAP) - 02006

Arkansas Dept. of Environmental Quality - 88-0681

Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023

Florida Dept. of Health (NELAC) - E87595

Kansas Dept. of Health Environment - E-10266

U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Report of Batch Surrogate Recovery

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

Report: 2067591

Batch: 83587

Lab ID	Type and Qualifiers	Sur 1 %Rec	Sur 2 %Rec	Sur 3 %Rec	Sur 4 %Rec	Sur 5 %Rec	Sur 6 %Rec	Sur 7 %Rec	Sur 8 %Rec
20507511	Sample D1	0 D	0 D						
20508186	BLANK	97	84						
20508187	LCS	94	97						
QC limits:		22-165	42-146						

Sur 1: n-Pentacosane (S)

Sur 2: o-Terphenyl (S)

\* denotes surrogate recovery outside of QC limits.

D denotes surrogate recovery is outside of QC limits due to sample dilution, and is not considered an excursion.

\ Lab ID consisting of a batch number with a B suffix is a method blank.

. Lab ID consisting of a batch number with a S suffix is an LCS.

A Lab ID with a MS suffix is a matrix spike.

A Lab ID with a MSD suffix is a matrix spike duplicate.

3/22/2007 15:56:55

New Orleans Laboratory Certifications  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (NELAC) - E87595  
Kansas Dept. of Health, Environment - E-10266  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Report of Method Blank

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

Lab ID: 20508186

Description: 8015 TPH Extractables Soil

Project No.: 2067591

Method: EPA 8015 Mod Ext

Batch: 83587

Units: mg/kg

Prep Factor: 1

Leached:

Prepared: 19-Mar-07

Analyzed: 03/19/07 19:42 SPP1(1)

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
	Diesel Range Organics (C10-28)	1	ND		100.
	Oil Range Organics (>C28-40)	1	ND		500.

2 compound(s) reported

ND denotes Not Detected at or above the reporting limit.

DF denotes Dilution Factor.

RL denotes sample Reporting Limit.

Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

Analysis performed in (1) New Orleans, (2) Baton Rouge, (3) Bossier City, (4) Houston, or (0) subcontract or field.

3/22/2007 15:56:38

New Orleans Laboratory Certifications  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (FELAC) - E87595  
Kansas Dept. of Health, Environment - E-10266  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270



## Report Qualifiers

**Pace Analytical Services, Inc.**  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
Phone: 504.469.0333  
Fax: 504.469.0555  
LELAP # 02006

---

Project: **2067591**

---

### General Qualifiers

Qualifier	Qualifier Description
D1	The analysis was performed at a dilution due to the high analyte concentration.

### Sample Qualifiers

Qualifier	Qualifier Description
P2	The sample extract could not be concentrated to the method specified final volume. The reporting limit is elevated accordingly.
P5	A medium level preparation was performed based upon screening data or the nature of the sample matrix.

---

3/22/2007 15:57:00

New Orleans Laboratory Certifications  
Louisiana Dept. of Environmental Quality (LELAP) - 02006  
Arkansas Dept. of Environmental Quality - 88-0681  
Louisiana Dept. of Health and Hospitals / Drinking Water - LA060023  
Florida Dept. of Health (NELAC) - E87595  
Kansas Dept. of Health Environment - E-10266  
U.S. Dept. of Agriculture Foreign Soil Permit - S-47270

# CHAIP™ CF-CUSTODY / Analytical Request Document

The C. J. Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page Analytical

Section A  
Required Client Information:

Company

Address

City/State

Zip

Phone

Fax

E-mail

Section B  
Required Project Information:

Report To

Copy To

Purchase Order No.

Project Name

Project Number

Section C  
Invoice Information:

Attention

Company Name

Address

Phone

Fax

E-mail

Page: 1 of 1

3067591

938471

REGULATORY AGENCY

☐ INPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ RCRA ☐ Other

SITE LOCATION

☐ SOG ☐ DIL ☐ GIN ☐ LMB ☐ MIN ☐ CNC ☐ BOH ☐ OSC ☐ BVI ☐ OTHER

Section D  
Required Client Information:

One Character per Box (A-Z, 0-9, -)

SAMPLE ID

SAMPLE ID MUST BE UNIQUE

Section E  
Required Project Information:

Matrix Code

Sample Type

Container

Preservatives

Section F  
Required Analytical Information:

Requested Analysis

Requested Date

Requested Time

Additional Comments:

RECEIVED BY / AFFILIATION

DATE

TIME

ACCEPTED BY / AFFILIATION

DATE

TIME

SAMPLE CONDITION

Received

Released

Quarantined

Released

SAMPLER NAME AND SIGNATURE

PRINT NAME OF SAMPLER

SIGNATURE OF SAMPLER

**Appendix H-2**  
**Groundwater Sampling and Analysis Plan**

**FINAL**

## **APPENDIX H-2**

# **SAMPLING AND ANALYSIS PLAN GROUNDWATER MONITORING SYSTEM NO. 1 POND**

*Prepared for*  
UOP  
Shreveport, Louisiana

April 11, 2007

File No. 19228153.00001



URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, Louisiana 70806  
225/922-5700

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----------	----------------

### EXHIBITS

Groundwater Sample Collection Chain-of-Custody Form
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## 1.0 INTRODUCTION

This Sampling and Analysis Plan has been developed for the groundwater monitoring system and the corrective action program for the No. 1 holding pond at the UOP facility near Shreveport, Louisiana. The purpose of this Sampling and Analysis Plan is to establish sampling procedures so that groundwater samples are collected, handled, and analyzed in a consistent and technically sound manner to minimize the possibility of sampling and analytical error resulting in erroneous data. This Sampling and Analysis Plan has been developed in accordance with LAC 33:VII.521.F.5.c. and 709.E.2. and the previous agreements with the Louisiana Department of Environmental Quality (LDEQ) that are included in the Solid Waste Permit Application in Appendix H-1.

The groundwater monitoring system is discussed in Section 2.0.

Monitoring parameters, sampling frequency, analytical methods, sample containers and preservation, and holding time are discussed in Section 3.0.

Preparation for each sampling event is discussed in Section 4.0.

Depth measurement procedures are presented in Section 5.0.

Well evacuation procedures are presented in Section 6.0.

Sampling procedures are presented in Section 7.0. Field analyses are also discussed in the section.

Sample handling procedures are discussed in Section 8.0. These procedures include sample labels, chain-of-custody documentation, and sample shipment.

Sampling documentation is presented in Section 9.0.

Laboratory analyses are discussed in Section 10.0.

Quality assurance/quality control procedures are presented in Section 11.0.

Disposition of purge water, rinse water, and field samples are discussed in Section 12.0.

## **2.0 GROUNDWATER MONITORING SYSTEM**

### **2.1 Monitoring Program**

UOP has implemented two groundwater systems for the No. 1 Pond. One system is for the routine monitoring of the pond and the other system is a groundwater recovery system to remediate elevated chlorides. These systems are discussed in more detail in Appendix II-1.

### **2.2 Monitoring System**

The groundwater monitoring system consists of one upgradient monitoring well and four downgradient wells. The upgradient monitoring well is MW-2. The downgradient monitoring wells are MW-5, MW-6, MW-7, and MW-12. Monitoring well locations are shown in Figure H-2.1. Well construction information is presented in Table H-2.1.

To assist in determining the groundwater potentiometric surface and flow direction, four piezometers are used. The piezometers are PW-1, PW-4, PW-11 and PW-16. These piezometers are only used to measure groundwater levels and are not sampled. Piezometer locations are shown in Figure H-2.1.

### **2.3 Corrective Action**

The corrective action program is a groundwater recovery system. The recovery system consists of four recovery wells located approximately 800 feet downgradient of the No. 1 Pond. These wells are identified as recovery wells RW-1, RW-2, RW-3, and RW-4. To assess the effectiveness of the system, three observation wells have been installed downgradient of the recovery system. Observation wells are identified as OW-3, OW-14, and OW-15. Recovery and observation well locations are shown in Figure H-2.1. Well construction information is presented in Table H-2.1.

## **3.0 SAMPLING PARAMETERS**

UOP operates a groundwater monitoring system and a groundwater recovery system for the No. 1 Pond. Samples from these systems are collected and analyzed for different parameters on different frequencies, depending on the system. Monitoring of these systems is conducted in accordance with agreements with LDEQ, included in Appendix H-1 of the Solid Waste Permit Application.

### **3.1 Monitoring Parameters**

All samples must be analyzed in accordance with analytical methods specified in SW-846, 3rd Edition as revised or equivalent analytical methods. Monitoring parameters and sampling frequency are presented in Table H-2.2. Sampling parameters, analytical methods, containers, preservatives, and holding times are presented on Table H-2.3.

#### **3.1.1 Groundwater Monitoring Parameters**

Groundwater monitoring wells are sampled semi-annually (twice per year) for the following parameters.

- pH
- Total dissolved solids (TDS)
- Specific conductance
- Turbidity
- Sulfate
- Sodium
- Chloride
- Barium
- Aluminum
- Copper
- Nickel
- Thallium
- Nitrate
- Total Petroleum Hydrocarbon-Diesel Range Organics (TPH-DRO)

Monitoring parameters and sampling frequency are presented in Table H-2.2.

#### **3.1.2 Corrective Action Program**

Corrective action recovery wells and observation wells are sampled semi-annually (twice per year). Groundwater samples from these wells are analyzed for chloride in accordance with agreements with the LDEQ included in Section H-1 of the Solid Waste Permit Application. Corrective action monitoring parameters and sampling frequency are presented in Table H-2.2.

### **3.2 Sample Containers**

Groundwater samples must be properly containerized upon collection. Containers will be selected such that they do not alter or affect groundwater analyses. Typically, groundwater

samples are collected in glass or plastic containers. The volume required varies depending on the analysis. Sample container types and volumes are listed in Table H-2.3.

### **3.3 Sample Preservation**

Many chemical parameters are unstable in water and may change before analysis if the sample is not preserved at the time of sampling. As a result, samples must be properly preserved in accordance with applicable analytical methods. Methods of preservation are listed in Table H-2.3.

Sample containers may be shipped with preservatives already in them or preservatives may be shipped in separate containers, to be added after the sample container has been filled.

Upon collection, all samples will be placed in coolers containing ice or freezer packs.

### **3.4 Holding Times**

Once groundwater samples are collected, they must be analyzed within a specified period of time to maintain valid results. Some parameters such as pH and specific conductance will be analyzed in the field upon collection. Groundwater samples sent to an analytical laboratory will be analyzed within the proper holding times. Holding times are listed in Table H-2.3.

## **4.0 SAMPLING PREPARATION**

### **4.1 Equipment**

Sampling equipment to be used for collecting representative samples of ground water may include the following:

- 100-foot fiberglass, plastic, or steel measuring tape with weighted bottom or electronic water level indicator
- Several gallons of distilled water and wash bottle
- Clean rags, paper towels
- Plastic sheeting or large size garbage bags
- Pump with appropriate hoses and fittings, or other means of purging groundwater
- Graduated bucket
- Sample containers for each well (see Section 4.2)
- Sample container labels and water-proof marking pen

- Disposable Bailers and rope or string to collect groundwater samples
- pH meter
- Thermometer
- Specific conductance meter
- Preservatives for groundwater samples, if not included with the containers
- Field log and forms, as applicable
- Ice chest and ice or freezer packs

## **4.2 Calibration of Field Instruments**

Some parameters, such as pH and specific conductance will be measured in the field. Prior to the sampling event, the field instruments used to measure these parameters will be checked to ensure that they are in proper working order.

Field instruments will be calibrated at least once a day for each day of sampling in accordance with the manufacturer's specifications. The instruments will be calibrated prior to the sampling activities of each day. If sampling conditions, primarily temperature, change during the course of the day, then the instruments will be calibrated on a more frequent basis.

## **4.3 Decontamination of Equipment**

Prior to actually beginning any field sampling, all equipment, except for dedicated in-well sampling equipment, to be used in sampling will be decontaminated. This process will be repeated between each sample collection for equipment that is reused. Decontamination will consist of thorough washing of sampling equipment with a decontamination solution (water and phosphate free detergent) followed by a thorough rinsing with deionized water.

## **5.0 DEPTH MEASUREMENTS**

Depth measurements are necessary to determine the groundwater elevation, the direction of groundwater flow, the volume of water to be evacuated from each well, and to determine whether sediment is accumulating in the bottom of a well.

All depth measurements will be taken prior to sampling. Depth measurements will be made to the nearest 0.01 foot. Depth measurements will be recorded in the field log. Following the measurements in each well, the equipment used for depth measurements will be decontaminated with the procedures described in Section 4.3. Depth measurements may be measured by an electronic water level indicator or by a tape measure with a "bell" on the end.

## **5.1 Depth to Water Measurements**

### Electronic Water Level Indicator

Using the electronic water level indicator, lower the probe down the center of the casing and allow cord to go untangled down the well. The instrument will indicate contact of the probe with the water surface by sounding an alarm or illuminating a light, or both. When contact with the water surface is indicated, record the depth marked on the cord of the probe to the top of the well casing to the nearest 0.01-foot in the field log. To determine water elevation, subtract the depth to water measurement from the elevation of the well casing. Top of casing elevations are listed in Table H-2.1.

### Tape

Using a decontaminated fiberglass, plastic, or steel measuring tape, lower the weighted tape down the center of the casing. Using this procedure, contact with the water surface is indicated by a "plopping" sound. The tape should be raised and lowered until the bell just makes contact with the water surface. When contact with the water surface is indicated, measure the depth marked on the tape to the top of the well casing to the nearest 0.01-foot. Record depth to water in the field log. To determine groundwater elevation, subtract the depth to water measurement from the elevation of the well casing. Top of casing elevations are listed in Table H-2.1.

## **5.2 Total Depth Measurements**

The total depth of each well will be measured during each sampling event unless the well contains a dedicated pump. In wells with dedicated pumps, the total depth will be measured annually. The well depths for all wells are listed in Table H-2-1. If total depth measurements show that 10% or more of a well screen is blocked with sediment, the well will be redeveloped prior to the next sampling event.

## **6.0 WELL EVACUATION**

Groundwater is evacuated or purged from monitoring wells to ensure that groundwater analyses are representative of the groundwater quality of the formation being monitored. To ensure that formation water is sampled, a minimum of three well volumes should be evacuated from the well. After the evacuation of each well volume, pH, specific conductance, and temperature will be measured. If there is sufficient water in the well, it should be evacuated until temperature, pH, and specific conductance have stabilized (vary less than 10 percent between measurements). One well volume is the volume of water standing in the well at the time of sampling. If a well is evacuated such that all of the water is removed or there is little water

remaining in the well after evacuation, then the well is sufficiently purged and it may be sampled after it has had sufficient time to recover. Well evacuation is performed as described below.

Calculate one (1) well volume. To find the volume of standing water in the well the following calculations will be used:

$$V = \pi r^2 h$$

Where:

$V$	=	volume (ft <sup>3</sup> )
$\pi$	=	3.14
$r$	=	radius of monitor well casing (feet)
$h$	=	height of standing water in well (feet)
Gallons	=	$V \text{ (ft}^3\text{)} 7.5$

The volume in gallons to be purged can be simplified as follows:

- 3-inch well  $V = 0.367 h$
- 4-inch well  $V = 0.652 h$

The height of standing water in the well is calculated by subtracting the depth to water measurement from the total depth of the well. The volume of one well volume should be entered in to the field log. An example groundwater sample collection report form that can be used for field data collection is included as Exhibit 1.

After calculating the required purge volume, the well can be evacuated. A well may be purged with either a portable pump or bailer. All equipment will be properly decontaminated prior to placement in a well. Alternatively, dedicated bladder pumps (e.g., Well Wizzard®) may be used to purge the wells.

To ensure that a sufficient volume of water is evacuated from each well, purge water should be collected in a container of known volume (such as a 5-gallon bucket). Purge water can be transferred to a larger container and handled as described in Section 12.

Three to five well volumes of water will be removed from the well to ensure an accurate sample of ground water quality; if this is not possible because the wells are low yielding, the well will be pumped or bailed to dryness before sampling.

After the well has been evacuated, the actual volume of water purged from the well will be entered into the field log.

## 7.0 SAMPLING PROCEDURES

At each well prior to collecting samples, the well should be allowed to recharge sufficiently. In some wells, this may require waiting a few minutes to a few hours; in other wells, recovery time may be extremely slow and sampling may not be possible until after 24 hours. If the well is not capable of producing sufficient water required for analyses, composite sampling may be necessary where small quantities of samples are taken several days in a row.

Groundwater samples will be collected using dedicated or disposable bailers and upgradient wells will be sampled prior to downgradient wells. Alternatively, dedicated bladder pumps (e.g., Well Wizzard<sup>®</sup>) may be used to collect the samples. When collecting samples, samples will be collected directly into the sample bottles provided by the laboratory. Care will be taken not to agitate samples in order to limit aeration of the samples.

Samples will be collected in the following sequence, as appropriate:

- TPH-DRO
- Metals
- Conventional (chlorides, nitrate, and sulfate)
- Temperature, pH, conductivity, and turbidity

Samples will be not field filtered prior to laboratory analysis for total metals. Acid preservative will be added to samples for total metals immediately after sample collection (without filtering). However, both total and dissolved (filtered) metals may be analyzed during some sampling events to evaluate the effect that suspended solids has on the results. Acid preservative will be added to samples for dissolved metals immediately after filtering in the field.

Analyses of temperature, pH and specific conductance will be made in the field at the time of sampling because these parameters change rapidly, and a laboratory analysis might not be representative of the true ground water quality. A sufficient volume of water (approximately 1 liter) will be collected from the well to determine temperature of water, specific conductivity and pH. An example groundwater sample collection form that can be used for field data collection has been included as Exhibit 1.

## **8.0 SAMPLE HANDLING PROCEDURES**

### **8.1 Sample Labels**

Each sample container will be properly labeled to ensure that samples are handled properly and analyzed in accordance with appropriate analytical methods and within appropriate holding times. Sample labels will be waterproof and written on with waterproof ink. Sample labels should have the following information.

- Sample number
- Well number
- Analysis
- Preservatives
- Date and time of collection
- Name or initials of sampler

### **8.2 Chain-of-Custody Procedures**

All samples will be recorded on a chain-of-custody form. The chain-of-custody will become the permanent record of sample handling and shipment. A chain-of-custody that may be used for this purpose is shown as Exhibit 2. The chain-of-custody will document the following information:

- Sample number;
- Well number;
- Date and time of collection;
- Sample matrix;
- Sample analyses and analytical methods;
- The number of containers for each sample for each analysis;
- The name of the sampler(s);
- Method of shipment;
- Persons involved in the chain of custody of the samples; and
- Date and time of custody transfer.

When custody is transferred, both the person relinquishing and receiving custody must sign in the proper place.

### **8.3 Shipment of Samples**

Samples will be placed in the ice chest or other shipping container to maintain the required temperature and to minimize the possibility of breakage of sample containers.

Prior to shipping, sample labels will be checked against the corresponding chain-of-custody record to ensure that sample numbers and containers agree with the chain-of-custody record.

If samples are hand delivered, the original chain-of-custody record will be retained by the person with custody of the samples. If the samples are sent to the laboratory by courier (such as overnight shipment) then the chain-of-custody record will be sealed in the shipping container with the samples.

After samples have been checked and packed, the shipping container will be closed and custody seals placed across the opening of the container to ensure the samples are not tampered with.

After sealing the container, the samples will be delivered as quickly as possible to the laboratory for analysis. Samples may be hand delivered to the laboratory or sent by a courier service.

## **9.0 SAMPLING DOCUMENTATION**

A field log (a bound logbook or compilation of field sheets) will be kept to record all pertinent information about each monitoring well sampling event. Records should be kept using waterproof ink. Documentation should be sufficient to reconstruct each sampling event without relying on the collector's memory. Entries in the log or on the sheets will include:

- Well identification number;
- Total well depth;
- Elevation of the top of casing;
- Water level;
- Water color (visual);
- Well evacuation procedures and equipment;
- Sample withdrawal procedures, date and time;
- Sample identification numbers;
- Field measurements and methods (temperature, pH, and specific conductance);
- Calibration information;
- Name of collector;
- Field observations;

- Calculations of standing water volume in the well; and
- Total volume evacuated.

An example of one type of groundwater collection report form is attached as Exhibit 1.

## **10.0 LABORATORY ANALYSES**

Samples submitted for laboratory analysis will be analyzed for the constituents and in accordance with the analytical methods specified in Table H-2.3.

All laboratory work and procedures will be performed in accordance with the specifications of the methods listed on Table H-2.3 or an equivalent substitute as approved by the LDEQ. All samples will be analyzed by an accredited laboratory in accordance with LAC 33:I.4501. The laboratory shall be accredited in those parameters for the applicable test categories.

## **11.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES**

For any sampling and analysis program it is imperative that a good quality assurance/quality control (QA/QC) program be implemented, and that all field sampling and laboratory analyses be conducted in compliance with these QA/QC guidelines. The objectives of the QA/QC program should be to develop procedures and techniques which when implemented will produce data which are accurate, complete, precise, representative and comparable.

### **11.1 Field QA/QC Procedures**

To ensure QA/QC of field measured parameters, equipment will be maintained and calibrated in accordance with manufacturer's specifications. Instruments for measuring pH and specific conductance will be calibrated with standard solutions as specified in the manual for each instrument. Both instruments will be adjusted for temperature, as appropriate.

Calibrations will be entered into the field log with the date and time.

In addition, any instrument malfunctions and problems will be noted in the field log.

To assess the variability of results, one duplicate sample will be collected for each sampling event. Duplicate samples will be collected, handled, and analyzed in the same manner as the other groundwater samples.

## **11.2 Laboratory Procedures**

The primary objective of the analytical and field quality assurance/quality control (QA/QC) plan is to ensure the integrity of sample results. To this end, all samples will be analyzed in the laboratory according to approved methodologies described in Table H-2.3. Laboratory QA/QC procedures will be as required by the analytical method and the laboratory QA/QC plan.

## **12.0 DISPOSITION OF PURGE WATER, RINSE WATER, AND FIELD SAMPLES**

All purged water, rinse water and field analyzed samples will be containerized in drums. Hazardous waste and hazardous waste constituents have not been detected in the purge water or rinse water during previous sampling events, therefore, purge water will be processed through the plant wastewater treatment process which sends water through a solids separation system. About fifty percent of the water is recycled through an evaporator before going back to the Spherical Catalyst Manufacturing plant distillate. The remaining water is stored in a brine tank before being deep well injected.

## TABLES

TABLE H-2.1

**MONITORING WELL, OBSERVATION WELL AND PIEZOMETER INFORMATION**  
**UOP**  
**SHREVEPORT, LOUISIANA**

MONITOR WELL INFORMATION						
Information	MW-2	MW-5	MW-6	MW-7	MW-12	
Unit monitored	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1
Zone monitored	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
Up/down gradient position	Up	Down	Down	Down	Down	Down
Well Construction	3" PVC	3" PVC	3" PVC	3" PVC	3" PVC	3" PVC
Casing slot size	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"
Sampling method	Bailer	Bailer	Bailer	Bailer	Bailer	Bailer
Ground surface elevation (ft msl)	288.39	271.62	270.72	272.65	280.80	280.80
Top of casing elevation (ft msl)	288.34	274.52	274.12	274.55	283.80	283.80
Casing Depth (ft)	40.00	40.00	35.00	40.00	54.00	54.00
Drilled depth (ft)	40.00	40.00	36.00	42.00	54.00	54.00
Top of screen elevation (ft msl)	260.4	242.92	247.52	242.95	233.80	233.80
Bottom of screen elevation (ft msl)	250.4	233.52	237.62	233.55	228.80	228.80
Screened interval (ft bls)	29-39	28.7 - 38.1	23.2 - 33.1	29.7 - 39.1	47 - 52	47 - 52
Type of grout	Cement/ Bentonite	Cement/ Bentonite	Cement/ Bentonite	Cement/ Bentonite	Cement	Cement
Latitude (N)	32°37'25.4"	32°37'09.5"	32°37'09.1"	32°37'09.1"	32°37'13.9"	32°37'13.9"
Longitude (W)	93°55'56.1"	93°55'54.2"	93°55'53.0"	93°55'49.5"	93°55'45.9"	93°55'45.9"

TABLE H-2.1 (Continued)

**MONITORING WELL, OBSERVATION WELL AND PIEZOMETER INFORMATION**  
**UOP**  
**SHREVEPORT, LOUISIANA**

OBSERVATION WELL, RECOVERY WELL AND PIEZOMETER INFORMATION												
Information	OW-3	OW-14	OW-15	RW-1	RW-2	RW-3	RW-4	PW-1	PW-4	PW-11	PW-16	
Unit monitored	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	Pond 1	
Zone monitored	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	
Up/down gradient position	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	
Well Construction	2" PVC	2" PVC	2" PVC	8" PVC	8" PVC	8" PVC	8" PVC	3" PVC	3" PVC	3" PVC	2" PVC	
Casing slot size	0.010"	0.010"	0.010"	0.020"	0.020"	0.020"	0.020"	--1	--1	0.010"	0.010	
Sampling method	Bailer	Bailer	Bailer	Bailer or Discharge Line	Bailer or Discharge Line	Bailer or Discharge Line	Bailer or Discharge Line	NA	NA	NA	NA	
Ground surface elevation (ft msl)	271.47	271.39	270.68	270.23	266.35	270.22	273.39	278.18	275.55	281.97	279.6	
Top of casing elevation (ft msl)	274.52	274.39	273.36	271.44	267.81	272.88	275.23	280.61	277.41	284.47	279.91	
Casing Depth (ft)	39.96	35.00	35.5	36.96	34.84	37.68	39.61	51.9 <sup>2</sup>	44.9 <sup>2</sup>	39.60	46.5	
Drilled depth (ft)	40.00	35.00	35.5	38.00	36.50	38.50	40.50	--1	--1	39.60	50	
Top of screen elevation (ft msl)	242.01	247.12	246.26	244.90	243.14	244.13	245.37	--1	--1	249.47	243.6	
Bottom of screen elevation (ft msl)	232.01	237.12	236.26	236.07	234.26	235.23	236.51	--1	--1	244.47	233.6	
Screened interval (ft bls)	29.46 - 39.46	24.27 - 34.27	24.42 - 34.42	25.33 - 34.16	23.21 - 32.09	26.09 - 34.99	28.02 - 36.88	--1	--1	32.5 - 37.5	36.46	
Type of grout	Cement	Cement	Cement	Cement/Bentonite	Cement/Bentonite	Cement/Bentonite	Cement/Bentonite	--1	--1	Cement	Cement/Bentonite	
Latitude (N)	32°37'4.2"	32°37'4.0"	32°37'3.9"	32°37'8.1"	32°37'8.2"	32°37'8.3"	32°37'8.3"	32°37'10.3"	32°37'09.5"	32°37'14.5"	32°37'21.35"	
Longitude (W)	93°55'56.7"	93°55'51.0"	93°55'49.3"	93°55'48.7"	93°55'51.0"	93°55'53.8"	93°55'56.1"	93°55'55.3"	93°55'49.4"	93°55'45.3"	93°55'54.76"	

## Notes:

- 1 These piezometers were installed in 1980 and complete construction documentation is not available.
- 2 As measured on August 23, 2007.

TABLE H-2.2

**WELL PARAMETERS AND SAMPLING FREQUENCY  
FOR WASTEWATER HOLDING POND  
UOP  
SHREVEPORT, LOUISIANA**

Parameter	MW-2	MW-5	MW-6	MW-7	MW-12	OW-3	OW-14	OW-15	RW-1	RW-2	RW-3	RW-4	PW-1	PW-4	PW-11	PW-16
Water Level Measurement	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
pH	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Total Dissolved Solids	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Specific Conductance	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Turbidity	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sulfate	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Barium	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sodium	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Chloride	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Aluminum	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Copper	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nickel	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Thallium	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nitrate	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
TPH-DRO	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

NOTES:

S = Semiannual analysis  
- = Not applicable

TABLE H-2.3

**GROUNDWATER MONITORING PARAMETERS**  
**UOP**  
**SHREVEPORT, LOUISIANA**

PARAMETER	SW-846 ANALYTICAL METHOD <sup>1</sup>	CONTAINER <sup>4</sup>		METHOD OF PRESERVATION	HOLDING TIME
		TYPE	VOLUME		
pH	Field Analysis 150.1 <sup>2</sup> 9040C 4500-H-B <sup>3</sup>	G,P	1 - 50 ml	Cool to 4° C if not analyzed immediately	Analyze Immediately
Total Dissolved Solids (TDS)	160.1 <sup>2</sup> 2540C <sup>3</sup>	G,P	1 - 500 ml	Cool to 4° C	7 days
Specific Conductance	Field Analysis 120.1 <sup>2</sup> 9050A	G,P	1 - 100 ml	Cool to 4° C	28 days
Turbidity	180.1 <sup>2</sup> 2130B	G,P	1 - 100 ml	Cool to 4° C	48 hours
Chloride	325.2 <sup>2</sup> 9250 9251 9252	G,P	1 - 500 ml	Cool to 4° C	28 days
Sulfate	375.4 <sup>2</sup> 9035 9036 9038	G,P	1 - 100 ml	Cool to 4° C	28 days
Barium	6010B,	G,P	1 - 250 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months
Sodium	6010B	G,P	1 - 250 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months
Aluminum	6010B	G,P	1 - 250 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months

TABLE H-2.3 (Continued)

**GROUNDWATER MONITORING PARAMETERS**  
**UOP**  
**SHREVEPORT, LOUISIANA**

PARAMETER	SW-846 ANALYTICAL METHOD <sup>1</sup>	CONTAINER <sup>4</sup>		METHOD OF PRESERVATION	HOLDING TIME
		TYPE	VOLUME		
Copper	6010B	G,P	1 - 500 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months
Nickel	6010B	G,P	1 - 500 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months
Thallium	6010B	G,P	1 - 500 ml	<sup>5</sup> Cool to 4° C, HNO <sub>3</sub> to pH < 2	6 months
Nitrate	353.2	G,P	1 - 250 ml	Cool to 4° C, H <sub>2</sub> SO <sub>4</sub> to pH < 2	48 hours
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	8015B	G (Amber)	2 - 1,000 ml	Cool to 4° C, HCL to pH < 2	7 days (extraction) 40 days (after extraction)

**NOTES:**

Monitor wells, MW-2, MW-5, MW-6, MW-7 and MW-12, to be sampled semiannually and analyzed as shown above during corrective action and detection monitoring periods. During corrective action monitoring, recovery wells, RW-1 through RW-4 and observation wells, OW-3, OW-14 and OW-15, to be analyzed semiannually for chlorides only. Piezometers, PW-1, PW-4, PW-11, to be gauged for water levels only on a semiannual basis.

P – plastic

G – glass

G (Amber) – Amber-tinted glass jar

<sup>1</sup> Test Methods for Evaluating Solid Waste, third edition, November 1986, as revised, December 1987 and 1994.

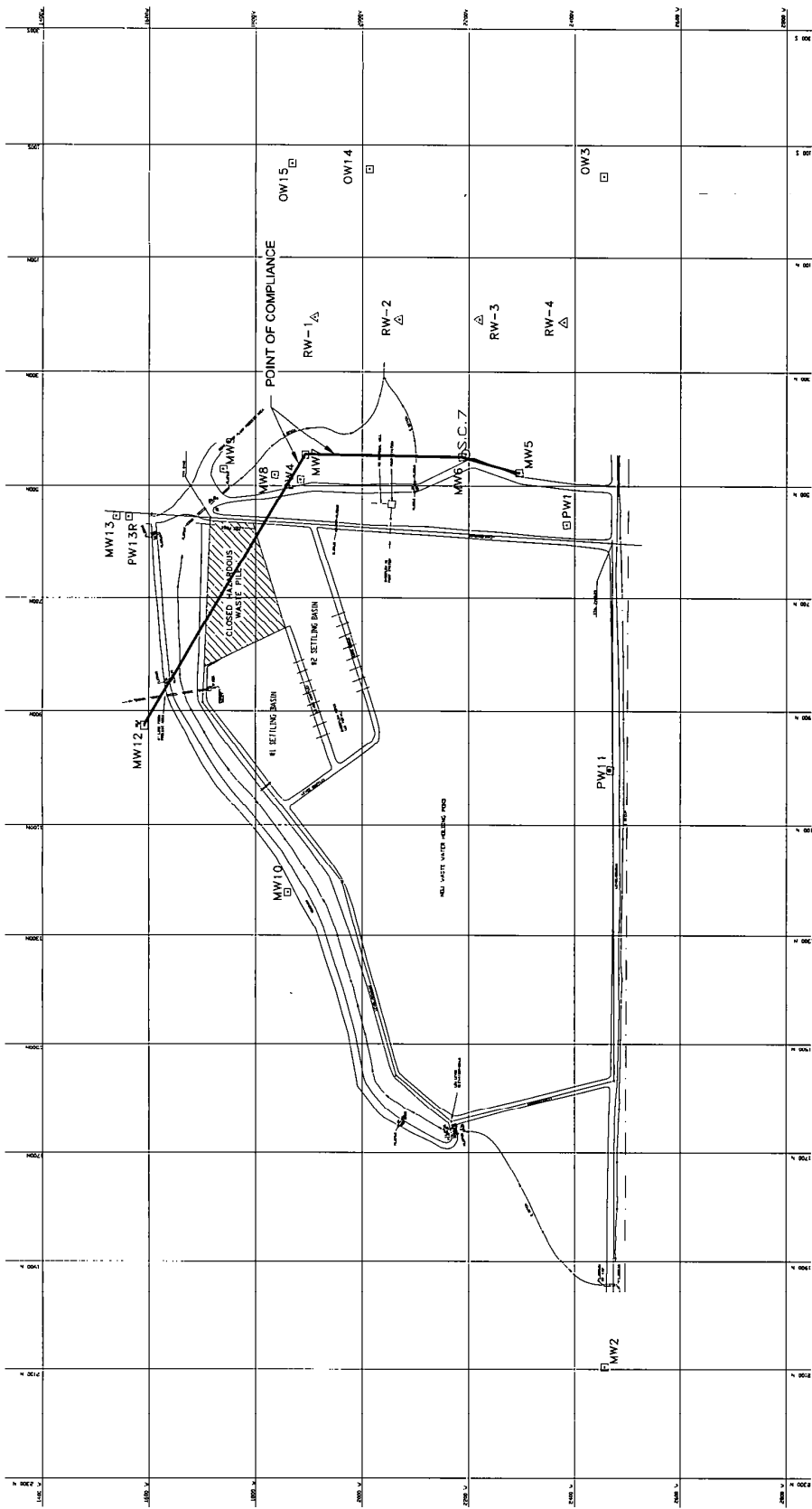
<sup>2</sup> Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, as revised, March 1983.

<sup>3</sup> Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> Edition. September 22, 2005.

<sup>4</sup> Can combine into like containers for samples that require the same method of preservation. Coordinate with the laboratory regarding sample containers and the required volumes.

<sup>5</sup> For total metals, add preservative into container immediately after sampling (without filtering). For dissolved metals, add preservative immediately after field filtering with a 0.45 micron filter.

## FIGURES



- LEGEND:
- BRASS CAP
  - MONITORING WELL, OBSERVATION WELL, AND PNEUMETER
  - △ CHLORIDE RECOVERY WELL

SCALE: 1 INCH=200 FEET  
200' 0 200'

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## EXHIBITS

## CHAIN-OF-CUSTODY RECORD

[illegible]

**SAMPLE COLLECTION:**

PROJECT NO. AND NAME: \_\_\_\_\_  
LOCATION OF SAMPLE: \_\_\_\_\_  
TEAM LEADER: \_\_\_\_\_ TELEPHONE: ( \_\_\_\_\_ )  
COMPANY NAME: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
WITNESS: \_\_\_\_\_ COMPANY NAME: \_\_\_\_\_

**FIELD INFORMATION:**

TYPES OF SAMPLES: LIQUID (LI) FISH (FI) SLUDGE (SL) SOIL (SO)  
 (MATRIX) WIPE (WI) SEDIMENT (SE) OTHER (SPECIFY) \_\_\_\_\_  
 FIELD NOTES: \_\_\_\_\_  
 TRANSPORTER: \_\_\_\_\_ AIRBILL/INVOICE: \_\_\_\_\_  
 DESTINATION: \_\_\_\_\_

**SAMPLE TRANSFER:** (Original must be retained with sample at all times)

		RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1	NAME:				
	COMPANY:				
2	NAME:				
	COMPANY:				

**TERMINATION OF CHAIN-OF-CUSTODY:**

AUTHORIZED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 COMPANY NAME: \_\_\_\_\_  
 SAMPLE DISPOSITION:    STORAGE                      DISPOSAL                      OTHER

# GROUNDWATER COLLECTION REPORT

PROJECT NUMBER AND NAME \_\_\_\_\_ SITE NUMBER \_\_\_\_\_  
COLLECTOR/OPERATOR \_\_\_\_\_ SITE NAME \_\_\_\_\_  
TYPE OF SAMPLE Groundwater ( ) COMPOSITE ( ) OTHER \_\_\_\_\_  
METHOD OF SAMPLING IF OTHER THAN MONITOR WELL \_\_\_\_\_ WELL NO. \_\_\_\_\_  
SHUTTLE NO. \_\_\_\_\_

## TEMPORARY WELL INFORMATION

EVACUATION: DATE/TIME \_\_\_\_\_ METHOD OF EVACUATION \_\_\_\_\_  
INITIAL DEPTH TO WATER LEVEL \_\_\_\_\_ TOP OF CASING TO BOTTOM \_\_\_\_\_  
GALLONS PER WELL VOLUME \_\_\_\_\_ TOTAL GALLONS EVACUATED \_\_\_\_\_  
FINAL DEPTH TO WATER \_\_\_\_\_

## STABILIZATION DATA

Time																
Temperature																
Conductivity																
pH																

## RECOVERY DATA

Time (min.)	2	5	7	10	15	20	25	30	40	50	60	120	140	24 hr	Final
Level (ft.)															

## REMARKS


SAMPLING PERSONNEL \_\_\_\_\_

TIME \_\_\_\_\_ TO \_\_\_\_\_

\_\_\_\_\_  
(SIGNED)

DATE \_\_\_\_\_

LOCK OR SEAL NUMBER \_\_\_\_\_ REPLACEMENT SEAL NUMBER \_\_\_\_\_

### **Appendix H-3**

#### **Groundwater Statistical Evaluation Plan**

## **APPENDIX H-3**

# **GROUNDWATER STATISTICAL EVALUATION PLAN NO. 1 POND**

*Prepared for*  
UOP  
Shreveport, Louisiana

August 29, 2007

File No. 19228153.00001



URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, Louisiana 70806  
225/922-5700

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## 1.0 INTRODUCTION

This Groundwater Statistical Evaluation Plan (GSEP) has been prepared for use on groundwater data collected at the UOP plant in Shreveport, Louisiana. This GSEP specifies statistical methods that are deemed appropriate for evaluating the effectiveness of ongoing groundwater recovery and corrective action monitoring at the facility. The basis for discontinuing the corrective action program and conversion to detection monitoring is discussed as well as the statistical methodology to be used during the detection monitoring period following corrective action.

The groundwater statistical evaluation plan has been developed in accordance with EPA's "Guidance Document on the Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities" and the June 1992 "Addendum to Interim Final Guidance" for selection of an appropriate statistical method as well as the Louisiana Solid Waste Rules and Regulations promulgated in February 1993.

Based on the current status of the facility and the recommended procedures as outlined by EPA, the statistical method to be used during and after corrective action is the use of statistical intervals, specifically confidence intervals about the mean. The interval will be compared to Groundwater Protection Standards (GWPS), to evaluate whether groundwater concentrations are statistically above the referenced standards.

## 2.0 BACKGROUND

The No. 1 Pond is currently under a corrective action monitoring program which was in existence prior to February 1993. Corrective measures are currently in operation for recovery of chlorides from the 40-Foot Zone groundwater of the No. 1 Pond Area. The operation of the chloride recovery system began in August 1991. The primary objective of the No. 1 Pond chloride recovery operation is to control the horizontal migration of chlorides from the No. 1 Pond by intercepting the groundwater flow of the 40-Foot Zone. To meet this objective, UOP has installed a chloride recovery well system consisting of four recovery wells (RW-1, RW-2, RW-3, and RW-4) located on an east-west line about 250 feet south of the southern edge of the pond. The wells are spaced approximately 150 to 250 feet apart, and they are screened at approximately 40 to 50 feet below the ground surface in the 40-Foot Zone.

The recovery operation is monitored by five monitoring wells (MW-2, MW-5, MW-6, MW-7 and MW-12), and three observation wells (OW-3, OW-14, and OW-15). Piezometers are also used around the area of the pond to aid in evaluating hydraulic effects of the recovery system.

The statistical methodology will apply<sup>i</sup> to the five monitoring wells that are located proximal to the pond.

### **3.0 APPROACH**

The corrective action plans, agreements and programs authorized by LDEQ will continue through the corrective action period. The means for evaluating the corrective action, the cleanup goals, the basis for discontinuing corrective action and reverting to detection monitoring were not previously established. The GSEP will therefore supplement these agreements by providing the statistical basis for evaluating the groundwater program at the site, detailed below.

#### **3.1 Objective**

The primary objective of the corrective action statistical evaluation program will be to evaluate whether groundwater recovery has remediated groundwater to levels acceptable to human health and the environment. In addition, the method should provide a means to evaluate whether a significant increase has occurred in the detection monitoring period following the corrective action period.

#### **3.2 Groundwater Protection Standards (GWPS)**

Table H-3.1 lists the groundwater protection standards (GWPS), which are based on the Louisiana Risk Evaluation Corrective Action Program (RECAP) Screening Standards. For constituents without Screening Standards, the secondary federal drinking water Maximum Contaminant Levels (MCLs) are used. GWPS were not established for sodium, turbidity, total dissolved solids, pH or specific conductance because these are parameters to evaluate general water quality. UOP may propose to modify the GWPS using the RECAP Methodology and one of the RECAP management options. With LDEQ approval, these modified RECAP Standards would be incorporated into this GSEP.

#### **3.3 Methodology**

The statistical methodology to be employed for the subject facility has been selected as being appropriate for the current groundwater recovery program in effect at the site and is known to be acceptable to EPA. The procedure will utilize the calculation of a confidence interval about the mean for each well and comparison of that confidence interval to certain GWPS. The method is very similar to prediction intervals, although the interval is based on the GWPS rather than background wells.

### **3.3.1 Performance Standards**

Procedures incorporating the use of statistically based confidence intervals can be used for both normal and lognormal distributions of data. The procedure outlined herein assumes a normal or lognormal distribution. The handling of nonnormality is discussed in section 4.0 along with the handling of nondetects.

The confidence interval compares an individual compliance well parameter with a GWPS. A confidence level of no less than 95 percent shall apply for the confidence interval method described herein.

At the present time, the need for corrections for spatial or seasonal variability is not considered necessary. In the event that such variability becomes evident, corrections shall be made consistent with EPA guidance documents.

### **3.3.2 Corrective Action Period**

Basically, the confidence interval method will consist of calculating a confidence interval for each well using the mean of the last 4 observations. If the upper confidence interval is above the GWPS, groundwater remediation will continue. Once the GWPS is attained for all parameters at all wells for a period of three years, the groundwater recovery system will be allowed to discontinue. Alternatively, UOP may continue groundwater remediation based on inspection of the results without calculating confidence intervals. If the facility has not been clean-closed by this time, then the facility will revert to a detection monitoring program. Alternatively, the actual results from a sampling event can be compared directly to the GWPS to demonstrate that concentrations remain above the GWPS (without calculating confidence intervals).

### **3.3.3 Detection Monitoring Period Following Corrective Action**

During the detection monitoring period, the facility will continue the use of the statistical confidence interval approach described above. For each well, the confidence interval of the mean will be calculated for each parameter using the mean values of the last four sampling events, similar to the corrective action period. In the event that the lower confidence limit of the mean is above the GWPS of any parameter in any well, this will be deemed statistical evidence that values are above the GWPS.

The procedure for implementing this method is detailed below.

## 4.0 PROCEDURE

### Step 1

Collect data from all wells semiannually. Tabulate results for last four consecutive events (last two years of semiannual sampling).

### Step 2

Evaluate nondetects and normality. (see end of section)

### Step 3

Calculate the mean,  $\bar{X}$ , and standard deviation,  $s$ , of the sample concentration values.

The mean of the parameter is calculated by summing parameter concentrations for the last four sampling events and dividing the total by the number of values. This may be expressed as follows:

$$\bar{X} = \frac{X_1 + X_2 + X_3 + X_4}{4}$$

Where  $\bar{X}$  is the mean concentration for the last 4 sampling events,  $X_1$  to  $X_4$  are the values for each of the last 4 sampling events, and 4 is the number of values used in the calculations.

The sample standard deviation( $s$ ) is calculated by first calculating the sample variance ( $s^2$ ). The variance is a measure of the variation within the data. The sample variance is calculated by summing the squares of the differences between the sample values and the mean and dividing the result by the number of degrees of freedom (number of samples minus one). The sample standard deviation is the square root of the sample variance. The sample variance is calculated as follows:

$$s^2 = \frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n - 1}$$

Where:

- $s^2$  is the sample variance for the last four events
- $\bar{X}$  is the sample mean for the last four events

- $X_i$  is the consistent concentration for the  $i^{\text{th}}$  sampling event
- $n-1$  are the degrees of freedom (number of values [4] minus 1)

The sample standard deviation is calculated as:

$$s = \sqrt{s^2}$$

Where:

- $s$  is the sample standard deviation
- $s^2$  is the variance calculated above

#### Step 4

Calculate the confidence interval about the sample mean as:

$$CL(\bar{x}, 95\%) = \bar{X} \pm t(n-1, 99\%) \frac{s}{\sqrt{n}}$$

Where:

- $CL$  is the parameter upper and lower confidence limit for the last four sampling events
- $\bar{X}$  is the parameter mean for the last four sampling events
- $s$  is the standard deviation for the last four sampling events
- $t$  is students' t-statistic with  $n-1$  degrees of freedom at a  $1-\alpha$  level of confidence (e.g., 95 percent confidence)
- $n$  is the number of samples used in the calculations (i.e., 4)

$t$  is obtained from available tables showing percentiles of students t-distribution as a function of the degrees of freedom at a defined level of confidence. The degrees of freedom is expressed as  $n-1$ , therefore for four sampling events,  $t$  will have 3 degrees of freedom.

For a 95 percent confidence level with 3 degrees of freedom,  $t=2.353$ . Alternatively, the actual results from a sampling event can be compared directly to the GWPS to demonstrate that concentrations remain above the GWPS (without calculating confidence intervals).

## Step 5

Compare the confidence interval to the GWPS.

During corrective action, if the upper confidence limit is above the GWPS, the conclusion is that there is a statistically significant difference between the constituent concentration and the GWPS, so corrective action should continue. In detection monitoring, if the lower confidence limit is above the GWPS, this would indicate that there is statistically significant evidence that the mean concentration exceeds the GWPS. Otherwise, the unit is in compliance.

If the upper confidence limit is below the GWPS for three consecutive years during corrective action, the conclusion is that there is not a statistically significant difference between the constituent concentration and the GWPS, so corrective action may be discontinued.

### Handling of Nondetects and Nonnormality

The above procedure is valid for situations where the data is normally or lognormally distributed and the parameters are naturally occurring and therefore detectable in most cases. This is expected to be the case for the majority of results at the UOP facility given the parameters and historical data (volatile organics have not been detected as of the permit date). However, the following provides for the handling of nondetects and nonnormality of data.

For a given parameter, if all values are below detection limit, no statistical evaluation is necessary for that parameter. If less than 15 percent of the values are nondetects, take one-half of the method detection limit as the value and proceed with step 3. (The majority of parameters are naturally occurring and can be evaluated with the subsequent steps). Otherwise, EPA guidance manuals should be referenced for a proportional nonparametric statistical method for this parameter(s).

Normality may be checked by the coefficient of variation test, Chi-square test, probability plots or the Shapiro-Wilk test. However, a sufficient number of samples are required for any normality test (minimum of 12 samples). Reference should be made to EPA guidance manuals in performing these tests. If data are not normally distributed, the data should be checked for lognormality. If the data are lognormally distributed, then proceed with the procedure detailed above; however, the GWPS should also be transformed to its natural logarithm for comparison. Nonparametric interval methods should be used in the event that the data are not normally or lognormally distributed. These methods are relatively easy to use and the EPA guidance documents should be consulted for reference.

Figure H-3.1 is a flowchart of the groundwater monitoring program.

## **5.0 REPORTING REQUIREMENTS**

Three bound copies of a report summarizing the results from each semiannual sampling event will be due within 90 days after completing semiannual sampling activities. The reports will include the following:

- Chain-of-custody documents.
- Potentiometric maps for the 40-foot zone.
- Analytical results.
- Chloride isoconcentration maps.
- Following the corrective action period and conversion to a detection monitoring program, statistical evaluations and a statement of whether a statistically significant difference in concentrations over GWPS will be conducted.

In the event of a significant statistical change during detection monitoring, LDEQ will be notified in accordance with LAC 33:I.Subpart 2. A written report will be sent to LDEQ within 14 days after the determination which identifies the parameter(s) causing the statistical exceedance. Within 90 days after the determination, UOP will either initiate an assessment monitoring program or submit a report to LDEQ demonstrating the change is due to causes other than an actual release. Confirmation of a significant change will indicate the need to conduct an assessment monitoring program as specified in LAC:VII.709.E.4 or to reestablish the groundwater recovery program.

## TABLES

**TABLE H-3.1**  
**GROUNDWATER PROTECTION STANDARDS**  
**UOP**  
**SHREVEPORT, LOUISIANA**

<b>Parameter</b>	<b>Groundwater Protection Standards (GWPS)<sup>1</sup> (mg/L)</b>	<b>Source of GWPS</b>
Sulfate	250	Secondary MCL
Chloride	250	Secondary MCL
Barium	2.0	RECAP Screening Standard <sup>2</sup>
Aluminum	3.65	Calculated RECAP Screening Standard <sup>3</sup>
Copper	1.3	RECAP Screening Standard <sup>2</sup>
Nickel	0.073	RECAP Screening Standard <sup>2</sup>
Thallium	0.002	RECAP Screening Standard <sup>2</sup>
Nitrate	10	RECAP Screening Standard <sup>2</sup>
Total Petroleum Hydrocarbon-Diesel Range Organics (TPH-DRO)	0.15	RECAP Screening Standard <sup>2</sup>

**NOTES:**

- <sup>1</sup> GWPS were not established for sodium, turbidity, total dissolved solids, pH, and specific conductance because these are parameters to evaluate general water quality.
- <sup>2</sup> Louisiana Department of Environmental Quality. Risk Evaluation Corrective Action Program (RECAP). October 20, 2003.
- <sup>3</sup> URS Corporation. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana. January 11, 2006.

## FIGURES

FIGURE H-3.1 Flowchart for Groundwater Monitoring Program

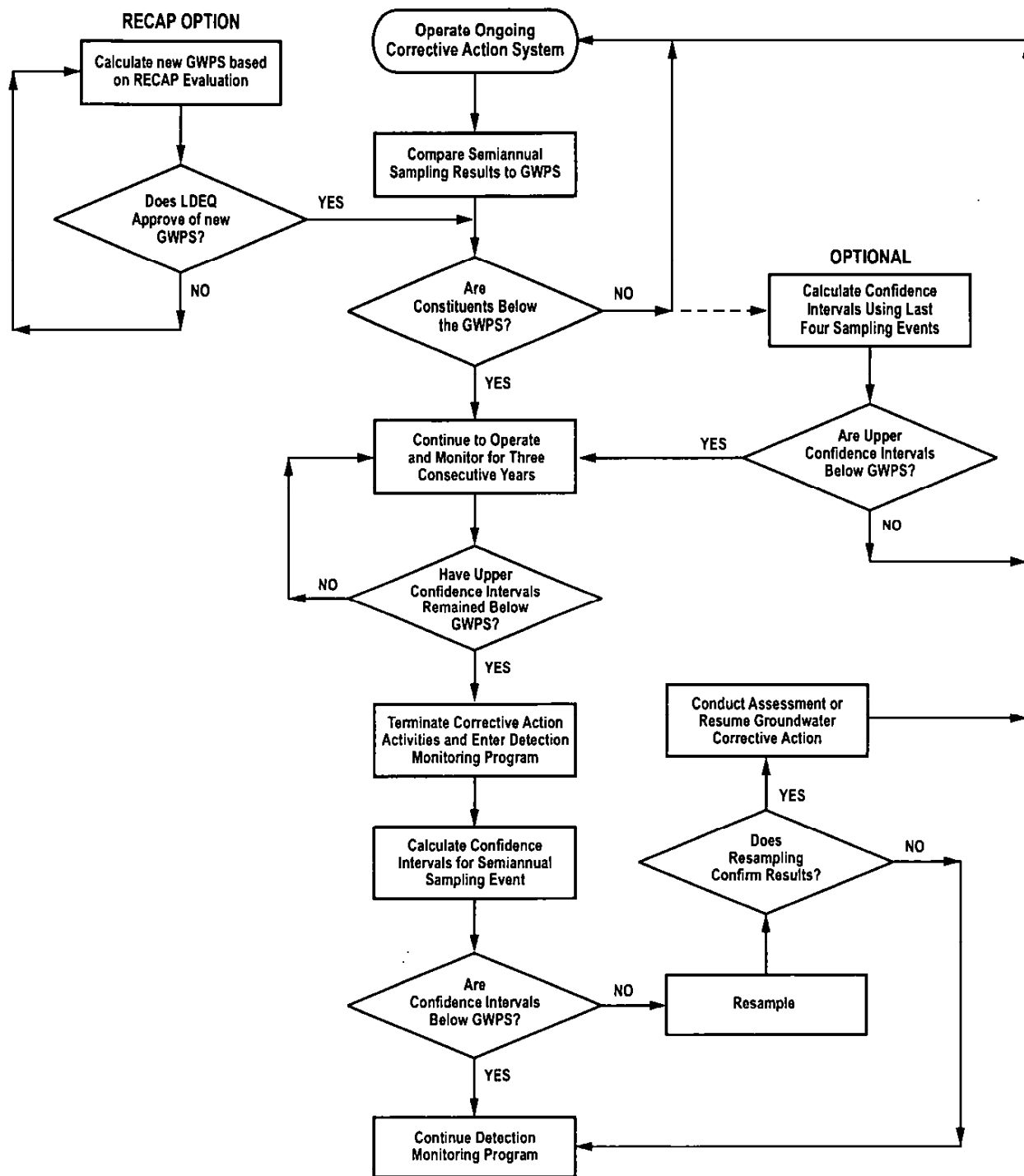


FIGURE H - 3 . 1

**Appendix II-4**

**Monitor Well Plugging and Abandonment Plan**

**UOP  
SHREVEPORT, LOUISIANA  
PLUG AND ABANDONMENT PLAN**

The plug and abandonment (P/A) of the wells at UOP will be accomplished in accordance with the Louisiana "Water Wells Rules and Regulations" (LAC 70:XIII), as adopted by the Louisiana Department of Transportation and Development (LDOTD), Water Resources Section and the guidelines as set forth in the Louisiana Department of Environmental Quality Solid Waste Regulations (LAC 33:VII:709.E.1(e)) as revised February 20, 1993. The P/A will be accomplished in the following manner:

- The concrete pad and protective posts will be broken up and dismantled.
- The protective casing will be removed.
- An attempt will be made to pull the well casing intact, including the surface and subsurface PVC pipe, grout seal, filter pack, well screen and native soil in immediate contact with the grout and subsequent installation of cement-bentonite grout. If the well casing is successfully pulled, the remaining borehole will be backfilled with a cement-bentonite grout mixture. The borehole will be backfilled from the bottom of the borehole by pumping the grout through a rigid tremie pipe. The grout mixture will be pumped into the borehole until grout overflows the hole onto the ground surface. The grout mixture will consist of one sack of Type I Portland cement or equivalent, 5 percent bentonite by dry weight (approximately 4.7 pound) and approximately 8.5 gallons of potable water mixed in a homogeneous, lump-free mixture. The bentonite will consist of 100 percent pure sodium bentonite with no additives and will be added after the cement and water are completely mixed. Mud balance readings will be taken with each grout mix.

- If pulling the well casing and screen is not possible or successful, the well or remainder of the well will be drilled out to a slightly larger diameter with the appropriate sized drill bit to the bottom of the well to flush out remaining casing and screen. The resulting annular space will be grouted with cement-bentonite slurry grout mixture using the tremie pipe method from the bottom of the hole to ground surface as described above.
- If all or part of the well casing cannot be plugged and abandoned by pulling or overdrilling as described above, the well will be plugged and abandoned by tremieing a cement-bentonite grout inside the well's casing from the bottom of the well to the ground surface. In the event, the following will be submitted:
  - supporting documentation prior to plugging the well that demonstrates that removal of all or part of the well's casing and other components of the well would be detrimental to the environment, and /or
  - certification and supporting documentation by a qualified professional that shows that removal of the well's casing was attempted and that continued attempts to remove all or a part of the well's casing and other components of the well would be detrimental to the environment.
- The grout backfill will be allowed to set for a minimum of 24 hours. After setting a minimum of 24 hours, the backfill will be inspected, and additional grout will be added as necessary to bring firm grout to within one foot of the ground surface. The remaining space below ground surface will be backfilled to the ground surface with clean compacted clay.
- All surface features will be disposed of in an environmentally sound manner.

When the well P/As are completed, UOP will complete the required P/A forms will be submitted to the LDOTD and a letter with documentation to the LDEQ-Solid Waste Division advising that P/A was completed in accordance with the approved P/A plan. UOP will also maintain records of the P/A.

**Appendix H-5**  
**Monitor Well Installation Plan**

**UOP  
SHREVEPORT, LOUISIANA  
MONITOR WELL INSTALLATION PLAN**

All wells installed at the site shall be in accordance with the "Water Wells Rules, Regulations, and Standards, State of Louisiana" (LAC 70:XIII) as adopted by the Louisiana Department of Transportation and Development, Water Resources Section. Approval from the Louisiana Department of Environmental Quality, Solid Waste Division will be obtained prior to construction of the monitoring wells.

**EQUIPMENT**

**Drill Rig**

The well installation specified in this work plan will be accomplished using hollow stem, solid stem auger or hydraulic rotary drill rigs.

Only teflon tape or vegetable-based lubricants will be used on the threads of downhole drilling equipment. Additives containing lead or copper will not be used. Any hydraulic or other fluids used in the drilling rig, pumps, or other field equipment/vehicles will not contain polychlorinated biphenyls (PCBs).

If antifreeze is added to a pump, hose, etc., in an area in contact with drilling fluids, this antifreeze will be completely purged prior to the equipment's use in drilling, mud mixing, or any other part of the overall drilling operation. Only antifreeze without rust inhibitors and/or sealants will be used.

Drilling equipment that has a visible loss of grease, hydraulic fluids, oils, fuels and/or transmission oil to drilling fluids or the borehole will not be allowed for soil boring activities until the problem is corrected.

### **Recirculation Tanks**

Hydraulic rotary drilling operations will be conducted with portable recirculation tanks/pans for the "mud pit" and for mixing grout. Dug pits or sumps will not be used.

### **BORING METHODS**

The borings will be drilled using solid stem, hollow stem, or hydraulic rotary methods. Borings will be advanced by dry auger methods until free water is encountered. Drilling operations will be stopped for 10 to 15 minutes and the water level will be allowed to rise. The initial water and the water level after 10 to 15 minutes will be noted and recorded.

The boring will be continuously sampled in 2-foot intervals to the total depth. Samples will be obtained by hydraulically pushing a thin-walled Shelby tube or driving a split spoon sampler as conditions warrant at each 2-foot interval. All borings will be sampled and described by a geologist/engineer.

Soil boring logs will be recorded in the field. Borings and samples will be numbered in a systematic order. A typed copy will be prepared later which will be checked to verify that it accurately reproduces the field log.

Soil classifications will be in accordance with the Unified Soil Classification System. Soil classifications will be prepared in the field at the time of sampling by a geologist/engineer and are subject to change based upon laboratory test and/or subsequent review.

The field geologist/engineer will describe and classify each stratum. The locations of strata changes will be clearly defined on the logs at the appropriate depth. Depths will be recorded to the nearest tenth of a foot. When depths are estimated, the estimated range will be noted. The secondary features or changes within each stratum will also be recorded at the appropriate depth on the boring log where the change occurs. Strata descriptions will include the following parameters:

Parameter	Example
Classification	Sandy Clay
Unified Soil Classification	CL
Secondary Sedimentary Structures, Inclusions, Staining	Iron staining, calcareous nodules, oyster shells, laminated.
Consistency (cohesive soil)	Stiff
Density (noncohesive soil)	Loose
Moisture Content. Use relative term. Do not express as a percentage unless a value has been measured.	Dry, moist, wet, etc.

Other information to be placed on the soil boring logs, as appropriate, include:

- The drilling method used will be generally described either on each log or in a general legend.
- Each log will record the drilling sequence.
- Any special problems and their resolution will be recorded on the log (e.g., hole caving, recurring problems at a particular depth, sudden tool drops, excessive grout fill, drilling fluid losses, unrecovered tools in hole, lost casing, etc.).
- The dates for the start and completion of borings will be recorded on the log along with notation by depth for drill crew shifts and days of work.
- The depth of first encountered free water will be indicated. The depth of water after allowing the level to partially stabilize (10 to 15 minutes) will also be recorded along with the time between readings.
- Drilling Contractor
- Driller

- The estimated depth interval for each soil sample taken, classified, and/or retained will be noted on the log. For each driven (split spoon), and pushed (Shelby-tube) sample, the length of sample recovery and the sampler type and size (diameter and length) will be recorded.
- The blow counts, hammer weight, and length of hammer fall for driven samplers will be recorded in the log. The log will indicate whether the sampler was pushed or driven. Blow counts will be recorded in half foot increments when standard (1 3/8-inch ID by 2-inch OD) samplers are driven. For penetration of less than a half foot, it will be annotated in the log along with the blow count and the distance over which the count was taken.
- Special abbreviations used on a soil boring log and/or well diagram will be defined either in the log/diagram where used, or in a general legend.

## **WELL INSTALLATION**

The monitor wells will be installed and developed as described below.

An 8-inch or 10-inch borehole will be advanced to the bottom of the zone to be screened with continuous sampling and visual classification as noted in the previous sections. The borehole will not be advanced more than 4 feet beyond the proposed screened interval of the well. Clean water will be used to flush the borehole to remove as much drill wash water, mud, and debris as possible. Once adequately clean water returns are obtained, a 2-inch diameter schedule 40 PVC plastic riser pipe and a screen with a .01 inch slot size and a length no greater than 10 feet and equipped with flush threaded joints will be assembled and placed in the reamed borehole. PVC solvent glues will not be used in the well construction. With the well screen fixed at the desired depth, 20-40 filter sand will be placed in the annulus below, around and at least 2 feet above the screen unless conditions warrant otherwise. A layer of bentonite pellets of a minimum thickness of 2 feet will then be placed in the annulus on top of the sand

pack to act as a seal in order to prevent the migration of cement/bentonite grout into the screened zone.

### **Grouting**

After the bentonite is allowed to swell, a cement/bentonite grout will be placed in the annulus above the bentonite pellets. The grout will be mixed at an approximate ratio of 8 gallons of potable water per 94 pound sack of Type I Portland cement with about 4 percent bentonite gel. The grout will be mixed by recirculating through the pump into a clean, above-ground rigid container with an appropriate quantity of water. Manual mixing will not be done. Mixing activities will continue until a smooth lump free consistency is achieved with a uniform blend of the three components.

The grout will be pumped through rigid tremie pipe placed approximately six inches above the base of the zone to be grouted and slowly withdrawn during grouting operations.

The length of the well pipe and screen, depth to sand, depth to bentonite pellets and depth to grout will be measured with a weighted tape and recorded on well construction logs. Type of materials used will be recorded on construction logs.

After the grout has set for 24 hours, the annulus will be checked to be sure the well is grouted to the surface. Additional grout will be added as needed.

All cuttings from each borehole will be containerized for proper disposal.

### **SURFACE FEATURES**

The well will extend at least 3 feet above ground surface. A permanent mark will be cut (a small V notch) into the top outside edge of the well for survey and water level measuring purposes. A vent hole will be drilled in the riser pipe immediately below the well riser cap. A protective casing with a lockable cap will be placed over each well. There will be sufficient clearance between the cover and the top of the well as to not obstruct opening the casing cover. A weep hole will be placed in the side of the

protective cover at the base (above the concrete pad level). A sign or plate will be fixed to the protective well casing which will have the following information:

- Well identification number
- Identification of well as upgradient or downgradient
- Elevation of top of well casing in relation to mean sea level
- Screen depth in relation to mean sea level
- Well depth
- Date installed and any subsequent repairs
- Well construction contractor's name

The exterior protective casing and cover will be painted with a weather-resistant orange or yellow paint. The well designation will be placed on the outside of the protective casing using a paint of a contrasting color.

A pad will be placed around each well with a minimum distance of 2.5 feet from the well to the corner of the pad. The pad will be concrete and have a minimum thickness of four inches. Guard posts, anchored outside the well slab but not in contact with the slab and at least 3 feet in height and extending at least 1.5 feet into the ground, will be set around each well, except where field conditions make it impractical and or unnecessary.

## **WELL DEVELOPMENT**

After sufficient time has been allowed for the grout to properly set, the wells will be developed. Development will be accomplished by a combined surge/air lift technique. The air source will be an air compressor equipped with an oil filter, oil trap and an activated carbon filter. No water or additives will be added to the well during development. The development procedure will consist of an initial purging for sediment removal using intermittent cycling at two-minute intervals until all sediment and other fine-grained material is removed. The well will then be purged for a minimum of four hours or until the water discharge is reasonably clean. Purge water will be containerized for proper disposal.

## **WELL REGISTRATION AND REPORTING**

Following completion, these wells will be registered with the Louisiana Department of Transportation and Development in accordance with the State of Louisiana Water Well Rules, Regulations and Standards, dated November 1, 1985.

As required by the Solid Waste Permit application regulations, within 90 days after construction of the wells, UOP will submit well completion details verifying that the wells were constructed according to the approved specifications and to document construction procedures. The well completion details will include:

- Daily field notes documenting construction procedures and unusual occurrences, if any.
- Boring log for each well including surface elevations with respect to mean sea level or comparable reference points.
- As-built diagrams for each well showing all pertinent features such as elevation of reference point for measuring groundwater levels, screen interval, and ground surface. A permit modification request will be submitted if features change from the approved plans.

## **APPENDIX I**

### **NO. 1 POND SLUDGE ANALYSES**



7978 GSRH AVE. • BATON ROUGE, LA 70820

U O P INC  
SHREVEPORT, LA 71107  
April 29, 1992

Sample receipt at WEST-PAINE LABORATORIES INC is documented for your designated sample(s). Chain-of-custody documentation, if provided, is included in this report. Sample analysis was in accordance with Environmental Protection Agency protocol.

A. Standard Methods for the Examination of Water and Wastewater, 15th Ed, 1980

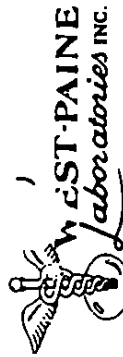
<u>Parameter</u>	<u>Method</u>
Sulfate/Extract	426C
Sulfate (Turbidimetric)	426C

B. Standard Methods for the Examination of Water and Wastewater, 16th Ed, 1985

<u>Parameter</u>	<u>Method</u>
Ammonia	417A&D
Chloride/Extract	407B
Chloride	407B
Chromium VI (Colorimetric)	312B
Fluoride/Extract	413B
Fluoride	413B
Nitrate/Extract	418C
Nitrate	418C
Reactivity Cyanide	412B&C
Reactivity Sulfide	427C
Silica (Dissolved)	425C&D
Specific Conductance/Extract	205
Specific Conductance	205
Total Kjeldahl Nitrogen	420A, 417D
pH/Extract	423

hal

203375



7878 GSRI AVE • BATON ROUGE, LA 70820

U O P INC  
SHREVEPORT, LA 71107  
April 29, 1992

B. Standard Methods for the Examination of Water and Wastewater, 16th Ed, 1985

Parameter  
pH

Method  
423

C. Standard Methods for the Examination of Water and Wastewater, 14th Ed, 1975

Parameter  
Phenol

Method  
510A&B

D. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, 1983

Parameter  
Aluminum  
Arsenic  
Barium  
Cadmium  
Chromium  
Cobalt  
Copper  
Iron  
Lead  
Manganese  
Mercury  
Molybdenum  
Nickel  
Selenium  
Silver  
Sodium

Method  
202.1  
206.2  
208.1  
213.1  
218.1  
219.1  
220.1  
236.1  
239.1  
243.1  
245.1  
246.1  
249.1  
270.2  
272.1  
273.1

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U O P INC  
SHREVEPORT, LA 71107  
April 29, 1992

D. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, 1983

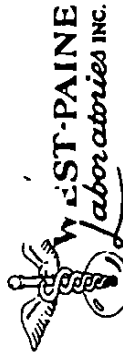
<u>Parameter</u>	<u>Method</u>
Thallium	279.1
Zinc	289.1

E. Test Methods for Evaluating Solid Waste, SW-846, July 1982

<u>Parameter</u>	<u>Method</u>
Arsenic	7060
Barium	7080
Cadmium	7130
Chromium	7190
Hexavalent Chromium	7197
Copper	7210
Lead	7420
Mercury	7470
Mercury	7471
Nickel	7520
Selenium	7740
Silver	7760
Thallium	7840
Zinc	7950

F. Methods of Soil Analysis American Society of Agronomy Inc., Part 2, 2nd Ed.

<u>Parameter</u>	<u>Method</u>
Silica	15-3.2



7979 GSRI AVE. • BATON ROUGE, LA 70820

U O P INC  
SHREVEPORT, LA 71107  
April 29, 1992

G. Test Methods for Evaluating Solid Waste, SW-846, July 1982

<u>Parameter</u>	<u>Method</u>
PCB'S	8080
Acid Extractable Compounds	TCLP 1311/8270
Base-Neutral Compounds	TCLP 1311/8270
Volatile Compounds	ZHE 1311/8260

H. Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, EPA-600/4-82-057, July 1982

<u>Parameter</u>	<u>Method</u>
PCB'S	608

Documented results are shown on the following page(s).

*B. G. Giessner*  
B. G. Giessner, Ph.D.  
Chief Operating Officer

Sample receipt at West Paine Laboratories, Inc. is documented for your designated sample(s). Chain-of-custody documentation, if provided, is included in this report. Sample analysis was in accordance with Environmental Protection Agency protocol:

A. Federal Register, Vol. 55, No. 126, Friday, June 29, 1990 - Final Rules

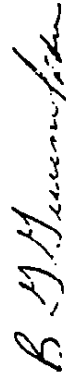
Parameter	Method
Volatiles	ZHE (1311)*
Semivolatiles, Pesticides/Herbicides, Metals	TCLP (1311)*

B. Test Methods for Evaluating Solid Wastes, SW-846, July 1982

Parameter	Method
Arsenic	7060
Barium	7080
Cadmium	7130
Chromium	7190
Lead	7420
Mercury	7470
Selenium	7740
Silver	7760
Volatiles	8260
Semivolatiles	8270
Pesticides/Herbicides	8080/8150

Documented results are shown on the following page(s).

\* Will be incorporated into SW-846, Third Edition

  
B. G. Giessner, Ph.D.  
Chief Operating Officer

U O P INC  
SHREVEPORT, LA 71107  
April 29, 1992

Sample Source: POND SLUDGE  
Date Collected: 92/03/24  
Date Received: 92/03/24

Time Collected: 12:45  
Time Received: 16:23

Parameter (Unit)	Result	Percent Recovery	Quality Assurance Actual/Found	Date/Time Analyst
pH/Extract (Units)	7.9	N/A	5.0/5.0	92/03/26 11:00 LPG
Chloride/Extract (mg/kg Cl)	3,650	N/A	50.0/49.5	92/03/26 14:30 SRN
Sodium (mg/kg Na)	970	N/A	50/48	92/03/31 10:00 JPA
Reactivity Cyanide (mg/kg CN)	1.3	N/A	0.050/0.053	92/03/30 13:30 JSW
Reactivity Sulfide (mg/kg S)	< 1.0	N/A	0.50/0.48	92/03/31 10:00 JSW
Sulfate/Extract (mg/kg SO <sub>4</sub> )	28	N/A	10.0/11.3	92/03/25 15:00 LML
Nitrate/Extract (mg/kg N)	1.34	N/A	0.50/0.46	92/04/02 13:00 JSW
Ammonia (mg/kg N)	2,880	N/A	15.0/14.1	92/04/06 15:00 CAE
Fluoride/Extract (mg/kg F)	< 0.1	N/A	0.50/0.50	92/04/03 14:30 SRN

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203375

Sample Source: POND SLUDGE  
Date Collected: 92/03/24  
Date Received: 92/03/24

Time Collected: 12:45  
Time Received: 16:23

Parameter (Unit)	Result	Percent Recovery	Quality Assurance Actual/Found	Date/Time Analyst
Specific Conductance/Extract (umhos/cm)	10,000	N/A	13000/13000	92/03/25 14:30 SRN
Phenol (mg/kg)	< 0.2	N/A	0.020/0.024	92/04/06 11:00 CAE
Arsenic (mg/kg As)	0.80	N/A	0.025/0.027	92/04/01 08:20 TAS
Barium (mg/kg Ba)	9.9	N/A	5.00/4.96	92/03/31 10:00 JPA
Cadmium (mg/kg Cd)	0.92	N/A	5.00/5.07	92/03/31 10:00 JPA
Chromium (mg/kg Cr)	5.5	N/A	5.00/4.99	92/03/31 10:00 JPA
Lead (mg/kg Pb)	< 4.0	N/A	5.00/5.06	92/03/31 10:00 JPA
Mercury (mg/kg Hg)	0.125	N/A	0.0100/0.0112	92/04/07 15:00 TAS
Selenium (mg/kg Se)	< 0.5	N/A	0.025/0.021	92/03/31 08:45 TAS

hal

203375

Sample Source: POND SLUDGE  
Date Collected: 92/03/24  
Date Received: 92/03/24

Time Collected: 12:45  
Time Received: 16:23

Parameter (Unit)	Result	Percent Recovery	Quality Assurance Actual/Found	Date/Time Analyst
Silver (mg/kg Ag)	2.4	N/A	0.50/0.51	92/04/01 09:30 RCD
Hexavalent Chromium (mg/kg Cr)	0.10	N/A	5.0/5.1	92/04/01 15:00 RCD
Copper (mg/kg Cu)	37	N/A	5.00/5.00	92/03/31 10:00 JPA
Nickel (mg/kg Ni)	19	N/A	5.00/5.02	92/03/31 10:00 JPA
Zinc (mg/kg Zn)	19	N/A	5.00/5.10	92/03/31 10:00 JPA
Cobalt (mg/kg Co)	< 2.0	N/A	5.00/5.07	92/03/31 10:00 JPA
Molybdenum (mg/kg Mo)	36	N/A	20.0/20.0	92/04/07 09:00 RCD
Aluminum (mg/kg Al)	350	N/A	5.00/4.93	92/03/31 10:00 JPA
Silica (mg/kg SiO <sub>2</sub> )	380	N/A	50/48	92/04/07 10:00 RCD

hal

203375

U O P INC  
 SHREVEPORT, LA 71107  
 April 29, 1992

Sample Source: POND SLUDGE  
 Date Collected: 92/03/24  
 Date Received: 92/03/24

Time Collected: 12:45  
 Time Received: 16:23

Parameter (Unit)	Result	Percent Recovery	Quality Assurance Actual/Found	Date/Time Analyst
Iron (mg/kg Fe)	1,900	N/A	50/50	92/03/31 10:00 JPA
Manganese (mg/kg Mn)	25	N/A	50/50	92/03/31 10:00 JPA
Thallium (mg/kg Tl)	48	N/A	10.0/9.7	92/04/02 09:00 RCD
Total Kjeldahl Nitrogen (mg/kg N)	3,080	N/A	15.0/14.8	92/04/28 16:40 EJL

The Toxicity Characteristic Leaching Procedure (TCLP) was employed as specified in the Federal Register, Vol. 55, No. 126, Friday, June 29, 1990. The results below for sample extract in mg/L represent the concentration in the final leachate. For purposes of comparison, the regulatory limit in mg/L of each component is also listed.

Sample Source: POND SLUDGE

Sample No.: 9201240061

Parameter	Corrected Results	Regulatory Limit In Extract	Spike Recovery	Quality Assurance Actual/Found	Date/Analyst
Arsenic (mg/L As)	< 0.2	5.0	89	5.0/5.13	92/03/30 JPA
Barium (mg/L Ba)	< 0.77	100	91	5.0/4.95	92/03/30 JPA
Cadmium (mg/L Cd)	< 0.01	1.0	80	5.0/5.03	92/03/30 JPA
Chromium (mg/L Cr)	< 0.06	5.0	82	5.0/4.92	92/03/30 JPA
Lead (mg/L Pb)	< 0.1	5.0	81	5.0/5.03	92/03/30 JPA
Mercury (mg/L Hg)	< 0.0002	0.2	98	0.0100/0.0087	92/04/03 SCJ
Silver (mg/L Ag)	< 0.01	5.0	100	0.50/0.51	92/03/30 RCD
Selenium (mg/L Se)	< 0.01	1.0	70	0.025/0.024	92/03/27 TAS

U O P INC  
SHREVEPORT, LA 71107  
SAMPLE #: 9203240061

PRIORITY POLLUTANTS  
PCB'S

All results in milligrams per kilogram

SAMPLE SOURCE: POND SLUDGE

Sample Date: 92/03/24 Sample Time: 12:45

Parameter	Result	Detection Limit
Aroclor-1242	< 1.0	1.0
Aroclor-1254	< 1.0	1.0
Aroclor-1221	< 1.0	1.0
Aroclor-1232	< 1.0	1.0
Aroclor-1248	< 1.0	1.0
Aroclor-1260	< 1.0	1.0
Aroclor-1016	< 1.0	1.0
Aroclor-1262	< 1.0	1.0
Aroclor-1268	< 1.0	1.0

Date of Analysis: 92/03/27 Analyst: MRM

Sample Source: POND SLUDGE Sample No.: 9203240061

Analytical Method No.: TCLP 1311/8270

Federal Register, Vol. 55, No. 126, Friday, June 29, 1990

Parameter	Regulatory Limit in TCLP Extract (mg/L)	Quantitation Limit (mg/L)	Corrected Results (mg/L)	Quality Assurance Spike Recovery (%)
<b>Acid(Phenol) Compounds:</b>				
<u>o-Cresol</u>	<u>200.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>m-Cresol</u>	<u>200.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>p-Cresol</u>	<u>200.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>Cresol</u>	<u>200.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>Pentachlorophenol</u>	<u>100.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>2,4,5-Trichlorophenol</u>	<u>400.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>
<u>2,4,6-Trichlorophenol</u>	<u>2.0</u>	<u>1.0</u>	<u>&lt; 1.0</u>	<u>N/A</u>

Date/Analyst: 92/04/09 DMR

QUALITY CONTROL DATA Surrogate Recovery (%)

2,4,6-Tribromophenol	62
2-Fluorophenol	57
Phenol-d6	66

Sample Source: POND SLUDGE

Analytical Method No.: TCLP 1311/8270

Federal Register, Vol. 55, No. 126, Friday, June 29, 1990

Parameter	Regulatory Limit in TCLP Extract (mg/L)	Quantitation Limit (mg/L)	Corrected Results (mg/L)	Quality Assurance Spike Recovery (%)
-----------	---	---------------------------------	--------------------------------	---

**Base-Neutral Compounds:**

1,4-Dichlorobenzene	7.5	1.0	< 1.0	N/A
2,4-Dinitrotoluene	0.13	1.0	< 1.0	N/A
Hexachlorobenzene	0.13	1.0	< 1.0	N/A
Hexachloro-1,3-butadiene	0.5	1.0	< 1.0	N/A
Hexachloroethane	3.0	1.0	< 1.0	N/A
Nitrobenzene	2.0	1.0	< 1.0	N/A
Pyridine	5.0	1.0	< 1.0	N/A

Date/Analyst: 92/04/09 DMR

**QUALITY CONTROL DATA Surrogate Recovery (%)**

2-Fluorobiphenyl	81
Nitrobenzene-d5	90
Terphenyl-d14	87

Sample Source: POND SLUDGE Sample No.: 9203240061

Analytical Method No.: ZHE 1311/8260

Federal Register, Vol. 55, No. 126, Friday, June 29, 1990

Parameter	Regulatory Limit in TCLP Extract (mg/L)	Quantitation Limit (mg/L)	Corrected Results (mg/L)	Quality Assurance Spike Recovery (%)
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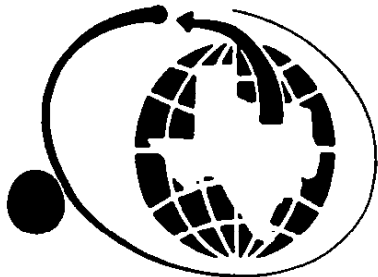
Volatile Compounds:

Benzene	0.5	0.05	< 0.05	101
Carbon tetrachloride	0.5	0.05	< 0.06	90
Chlorobenzene	100.0	0.05	< 0.05	98
Chloroform	6.0	0.05	< 0.05	100
1,2-Dichloroethane	0.5	0.05	< 0.05	112
1,1-Dichloroethylene	0.7	0.05	< 0.05	99
Methyl ethyl ketone	200.0	0.25	< 0.25	208
Tetrachloroethylene	0.7	0.05	< 0.07	68
Trichloroethylene	0.5	0.05	< 0.05	91
Vinyl chloride	0.2	0.05	< 0.06	88

Date/Analyst: 92/04/01 CPR

QUALITY CONTROL DATA Surrogate Recovery (%)

1,2-Dichloroethane-d4	103
4-Bromofluorobenzene	90
Toluene-d8	87



# NDRC LABORATORIES, INC.

A member of Inchcape Environmental

1089 East Collins Blvd., Richardson, Texas 75081 • (214) 238-5591 • FAX (214) 238-5592

BEAUMONT

DALLAS

HOUSTON

DATE RECEIVED : 25-MAR-1992

REPORT NUMBER : D92-2887-1

REPORT DATE : 6-APR-1992

SAMPLE SUBMITTED BY : West Paine Laboratories

ADDRESS : 2002 E Kentucky

: Ruston, LA 71270

ATTENTION : Ms. Tina Murray

SAMPLE MATRIX : Sludge

ID MARKS : Pond Sludge

PROJECT : UOP

PURCHASE ORDER NO : R0921053

DATE SAMPLED : 24-MAR-1992

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Corrosivity( Coupon )	6.35 mm/Yr	< 6.35 mm/Yr
Analyzed using EPA 1110 on 6-APR-1992 by ALD		

NDRC Laboratories, Inc.

*David R. Godwin* ✓ 2  
David R. Godwin, Ph.D.  
Chief Executive Officer

**APPENDIX J**  
**CLOSURE COST ESTIMATE**

## CLOSURE/POST CLOSURE COST ESTIMATE

### NO. 1 POND UOP SHREVEPORT FACILITY GD-017-0813

#### Assumptions:

1. In-place closure.
2. Water will be pumped off and handled in the recycle water treatment (RWT) system prior to the start of closure.
3. Water treatment during closure will include storage, flow equalization, and basic filtration (e.g., sand media vessels) of pond water prior to transfer to the RWT.
4. After water removal, the sludge thickness is assumed to be an estimated sludge volume of 45,500 in-place cubic yards (cyds)
5. The sludge will be dried/thickened and strengthened by moving and stacking. This would be handled in sections to aid in water control.
6. Drying and strengthening may require mixing with a solidification agent such as lime and/or mixing with the surrounding levee soils.
7. The sludge must achieve sufficient strength to support the cover.
8. After the sludge has attained sufficient strength, a combination of levee soils and imported fill will be brought to the appropriate grade.
9. After the sludge has been dried, a clay cover would be constructed.
10. The cover will consist of two feet of imported clay (with permeability less than  $1 \times 10^{-7}$  cm/s) overlain by six inches of topsoil.
11. After closure, the recovery well system would be removed and the groundwater addressed under the risk evaluation corrective action program (RECAP).
12. Post-closure care would include maintenance of the cap and maintaining the groundwater monitoring program for a 30-year post-closure period.
13. After the 30-year period, the monitoring wells will be plugged and abandoned and a closure certification report will be prepared for submittal to LDEQ.

# CLOSURE/POST CLOSURE COST ESTIMATE

## NO.1 POND UOP SHREVEPORT FACILITY GD-017-0813

Closure Costs		Activity	Units	Unit Cost	Unit Desc.	Total
<b>Engineering Costs</b>						
		Sampling/Bench-Scale Testing	1	\$25,000	total estimate	\$25,000
		Engineering Design/Closure Plan	1	\$75,000	total estimate	\$75,000
		Oversight (Assume onsite for 100 days)	100	\$1,000	days	\$100,000
		Surveying	1	\$15,000	total estimate	\$15,000
		Certification testing	1	\$20,000	total estimate	\$20,000
		Construction Certification Report	1	\$20,000	total estimate	\$20,000
		<b>Subtotal Engineering</b>				\$255,000
<b>Closure Construction Costs</b>						
		Mob/Demob/Site Prep	1	\$100,000	total estimate	\$100,000
		Water Treatment	1	\$50,000	total estimate	\$50,000
		Sludge strengthening/solidification (assume 3 feet of sludge over entire pond)	45500	\$20	cyds	\$910,000
		Fill material from levees	19000	\$3	cyds	\$57,000
		Imported fill	38600	\$10	cyds	\$386,000
		2 feet of recompacted clay	53400	\$15	cyds	\$801,000
		0.5 feet of Topsoil	13400	\$15	cyds	\$201,000
		Vegetation	14	\$1,800	acre	\$25,200
		<b>Subtotal Closure Construction Costs</b>				\$2,530,200
		<b>Total Closure Costs</b>				\$2,785,200

Post Closure Costs		Activity	Units	Unit Cost	Unit Desc.	Total
<b>Post-Closure Costs</b>						
		Groundwater Sampling/Reporting	30	\$10,000	annual	\$300,000
		Cap Maintenance	30	\$5,000	annual	\$150,000
		Plug and abandonment of recovery wells	4	\$2,000	each	\$8,000
		Plug and abandonment of observation and monitor wells	7	\$1,000	each	\$7,000
		RECAP Report	1	\$20,000	total estimate	\$20,000
		Final Closure Certification Report	1	\$15,000	total estimate	\$15,000
		<b>Total Post-Closure Costs</b>				\$500,000

**APPENDIX K**  
**FINANCIAL RESPONSIBILITY DOCUMENTATION**

*The following addresses the applicable sections from LAC 33.VII727.A.1 for financial responsibility during operation.*

**§727. Financial Assurance**

**A. Financial Responsibility during Operation and for Closure and Post-Closure Care**

**1. Financial Responsibility during Operation.** Permit holders or applicants for standard permits of Type I, I-A, II, II-A, and III facilities have the following financial responsibilities while the facility is in operation.

**a.** Permit holders or applicants for Type I and II facilities shall maintain liability insurance, or its equivalent, for sudden and accidental occurrences in the amount of \$1 million per occurrence and \$1 million annual aggregate, per site, exclusive of legal-defense costs, for claims arising from injury to persons or property, owing to the operation of the site. Evidence of this coverage shall be updated annually and provided to the Office of Environmental Services, Water and Waste Permits Division.

*Response:*

UOP has elected to use an irrevocable standby letter of credit to demonstrate financial assurance for liability coverage during operations. Annual aggregate amount of liability coverage is \$1,000,000. A copy of the letter of credit is attached.

*The remaining responses address the applicable sections related to using an irrevocable standby letter of credit as the financial assurance mechanism.*

**ii. Letter of Credit.** A permit holder or applicant may satisfy the requirements of this Section by obtaining an irrevocable standby letter of credit that conforms to the following requirements, and by submitting the letter to the administrative authority.

*Response:*

UOP has elected to use an irrevocable standby letter of credit to demonstrate financial assurance for liability coverage during operations. Annual aggregate amount of liability coverage is \$1,000,000. A copy of the letter of credit is attached.

**(a).** The issuing institution must be an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency.

*Response:*

The issuing institution (U.S. Bank National Association) meets these requirements.

**(b).** A permit holder or applicant who uses a letter of credit to satisfy the requirements of this Section must also provide to the administrative authority evidence of

the establishment of a standby trust fund. Under the terms of the letter of credit, all amounts paid pursuant to a draft by the administrative authority will be deposited by the issuing institution directly into the standby trust fund. The wording of the standby trust fund agreement shall be as specified in Clause A.2.d.ix of this Section.

*Response:*

Evidence of the standby trust fund meeting these requirements is attached.

(c). The letter of credit must be accompanied by a letter from the permit holder or applicant referring to the letter of credit by number, name of issuing institution, and date, and providing the following information: solid waste identification number, site name, facility name, facility permit number, and the amount of funds assured for liability coverage of the facility by the letter of credit.

*Response:*

A copy of the letter from UOP with the specified information is attached

(d). The letter of credit must be irrevocable and issued for a period of at least one year unless, at least 120 days before the current expiration date, the issuing institution notifies both the permit holder and the administrative authority by certified mail of a decision not to extend the expiration date. Under the terms of the letter of credit, the 120 days will begin on the date when both the permit holder and the Office of Environmental Services, Water and Waste Permits Division, receive the notice, as evidenced by the return receipts.

*Response:*

The letter of credit meets these requirements.

(e). The wording of the letter of credit shall be identical to the wording that follows, except that the instructions in brackets are to be replaced with the relevant information and the brackets deleted.

SOLID WASTE FACILITY  
IRREVOCABLE LETTER OF CREDIT

Secretary  
Louisiana Department of Environmental Quality  
Post Office Box 4313  
Baton Rouge, Louisiana 70821-4313  
Attention: Office of Environmental Services,  
Water and Waste Permits Division

Dear Sir:

We hereby establish our Irrevocable Standby Letter of Credit No. [ ] at the request and for the account of [permit holder's or applicant's name and address] for its [list site identification number, site name, facility name, and facility permit number] at [location], Louisiana, in favor of

any governmental body, person, or other entity for any sum or sums up to the aggregate amount of U.S. dollars [ ] upon presentation of:

1. A final judgment issued by a competent court of law in favor of a governmental body, person, or other entity and against [permit holder's or applicant's name] for sudden and accidental occurrences for claims arising out of injury to persons or property due to the operation of the solid waste site at the [name of permit holder or applicant] at [ site location] as set forth in the LAC 33:VII.727.A.1.

2. A sight draft bearing reference to the Letter of Credit No. [ ] drawn by the governmental body, person, or other entity, in whose favor the judgment has been rendered as evidenced by documentary requirement in Paragraph 1.

The Letter of Credit is effective as of [date] and will expire on [date], but such expiration date will be automatically extended for a period of at least 1 year on the above expiration date [date] and on each successive expiration date thereafter, unless, at least 120 days before the then-current expiration date, we notify both the administrative authority and [name of permit holder or applicant] by certified mail that we have decided not to extend this Letter of Credit beyond the then-current expiration date. In the event we give such notification, any unused portion of this Letter of Credit shall be available upon presentation of your sight draft for 120 days after the date of receipt by both the Department of Environmental Quality and [name of permit holder/applicant] as shown on the signed return receipts.

Whenever this Letter of Credit is drawn under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft directly into the standby trust fund of [name of permit holder or applicant] in accordance with the administrative authority's instructions.

Except to the extent otherwise expressly agreed to, the Uniform Customs and Practice for Documentary Letters of Credit (1983), International Chamber of Commerce Publication No. 400, shall apply to this Letter of Credit.

We certify that the wording of this Letter of Credit is identical to the wording specified in LAC 33:VII.727.A.1.d.ii.(e), effective on the date shown immediately below.

[Signature(s) and title(s) of official(s)]

of issuing institution(s)]

[date]

*Response:*

The letter of credit meets these requirements.

*The following addresses the applicable sections from LAC 33.VII.727.A.2 financial responsibility during closure and post-closure care.*

**2. Financial Responsibility for Closure and Post-Closure Care.** Permit holders or applicants of Type I, I-A, II, II-A, and III facilities have the following financial responsibilities for closure and post-closure care.

**a. Permit holders or applicants for processing or disposal facilities shall establish and maintain financial assurance for closure and post-closure care.**

*Response:*

UOP uses an irrevocable letter of credit for financial assurance for closure and post-closure care.

b. The applicant or permit holder shall submit to the Office of Environmental Services, Water and Waste Permits Division, the estimated closure date and the estimated cost of closure and post-closure care in accordance with the following procedures.

i. The applicant or permit holder must have a written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in these rules. The estimate must equal the cost of closure at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive, as indicated by the closure plan, and shall be based on the cost of hiring a third party to close the facility in accordance with the closure plan.

*Response:*

The closure cost estimate meeting these requirements was provided with the May 31, 2006 responses to LDEQ comments to the Permit Renewal Application

ii. The applicant or permit holder of a facility subject to post-closure monitoring or maintenance requirements must have a written estimate, in current dollars, of the annual cost of post-closure monitoring and maintenance of the facility in accordance with the provisions of these rules. The estimate of post-closure costs is calculated by multiplying the annual post-closure cost estimate by the number of years of post-closure care required and shall be based on the cost of hiring a third party to conduct post-closure activities in accordance with the closure plan.

*Response:*

The post-closure cost estimate meeting these requirements was provided with the May 31, 2006 responses to LDEQ comments to the Permit Renewal Application

iii. The cost estimates must be adjusted within 30 days after each anniversary of the date on which the first cost estimate was prepared on the basis of either the inflation factor derived from the Annual Implicit Price Deflator for Gross Domestic Product, as published by the U.S. Department of Commerce in its *Survey of Current Business* or a reestimation of the closure and post-closure costs in accordance with Clauses A.2.b.i and ii of this Section. The permit holder or applicant must revise the cost estimate whenever a change in the closure/post-closure plans increases or decreases the cost of the closure plan. The permit holder or applicant must submit a written notice of any such adjustment to the Office of Environmental Services, Water and Waste Permits Division, within 15 days following such adjustment.

*Response:*

UOP acknowledges this requirement.

iv. For trust funds, the first payment must be at least equal to the current closure and post-closure cost estimate, divided by the number of years in the pay-in period.

Subsequent payments must be made no later than 30 days after each annual anniversary of the date of the first payment. The amount of each subsequent payment must be determined by subtracting the current value of the trust fund from the current closure and post-closure cost estimates and dividing the result by the number of years remaining in the pay-in period. The initial pay-in period is based on the estimated life of the facility.

*Response:*

UOP uses the irrevocable letter of credit with a standby trust. A copy of the irrevocable letter of credit and a copy of the standby trust agreement are attached.

**c. Financial Assurance Mechanisms.** The financial assurance mechanism must be one or a combination of the following: a trust fund, a financial guarantee bond ensuring closure funding, a performance bond, a letter of credit, an insurance policy, or the financial test. The financial assurance mechanism is subject to the approval of the administrative authority and must fulfill the following criteria.

*Response:*

UOP uses the irrevocable letter of credit with a standby trust.

**i.** Except when a financial test, trust fund, or certificate of insurance is used as the financial assurance mechanism, a standby trust fund naming the administrative authority as beneficiary must be established at the time of the creation of the financial assurance mechanism into which the proceeds of such mechanism could be transferred should such funds be necessary for either closure or post-closure of the facility, and a signed copy must be furnished to the administrative authority with the mechanism.

*Response:*

UOP uses the irrevocable letter of credit with a standby trust. A copy of the irrevocable letter of credit and a copy of the standby trust agreement are attached.

**ii.** A permit holder or applicant may use a financial assurance mechanism specified in this Section for more than one facility, if all such facilities are located within Louisiana and are specifically identified in the mechanism.

*Response:*

UOP uses the irrevocable line of credit and standby trust specified in this application for the No. 1 Pond only. A separate letter of credit and standby trust is used for the closed Hazardous Waste Pile.

**iii.** The amount covered by the financial assurance mechanism(s) must equal the total of the current closure and post-closure estimates for each facility covered.

*Response:*

The amount covered by the irrevocable line of credit for closure and post-closure care is \$4,000,000, which exceeds the current closure and post-closure cost estimate.

**iv. When all closure and post-closure requirements have been satisfactorily completed, the administrative authority shall execute an approval to terminate the financial assurance mechanism(s).**

*Response:*

UOP acknowledges LDEQ's responsibility to terminate the financial assurance mechanism(s).

*The remaining responses address the applicable sections related to using an irrevocable standby letter of credit as the financial assurance mechanism.*

**g. Letter of Credit. A permit holder or applicant may satisfy the requirements of this Section by obtaining an irrevocable standby letter of credit that conforms to the following requirements and submitting the letter to the Office of Environmental Services, Water and Waste Permits Division.**

*Response:*

UOP has elected to use an irrevocable standby letter of credit to demonstrate financial assurance for closure and post-closure care. A copy of the letter of credit is attached.

**i. The issuing institution must be an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency.**

*Response:*

The issuing institution (U.S. Bank National Association) meets these requirements.

**ii. A permit holder or applicant who uses a letter of credit to satisfy the requirements of this Section must also provide to the administrative authority evidence of the establishment of a standby trust fund. Under the terms of the letter of credit, all amounts paid pursuant to a draft by the administrative authority will be deposited by the issuing institution directly into the standby trust fund. The wording of the standby trust fund shall be as specified in Clause A.2.d.ix of this Section.**

*Response:*

Evidence of the standby trust fund meeting these requirements is attached.

iii. The letter of credit must be accompanied by a letter from the permit holder or applicant referring to the letter of credit by number, issuing institution, and date, and providing the following information: solid waste identification number, site name, facility name, facility permit number, and the amount of funds assured for closure and/or post-closure of the facility by the letter of credit.

*Response:*

A copy of the letter from UOP with the specified information is attached

iv. The letter of credit must be irrevocable and issued for a period of at least one year, unless, at least 120 days before the current expiration date, the issuing institution notifies both the permit holder and the Office of Environmental Services, Water and Waste Permits Division, by certified mail of a decision not to extend the expiration date. Under the terms of the letter of credit, the 120 days will begin on the date when both the permit holder and the administrative authority receive the notice, as evidenced by the return receipts.

*Response:*

The letter of credit meets these requirements.

v. The letter of credit must be issued in an amount at least equal to the current closure and post-closure cost estimates.

*Response:*

The letter of credit was issued for \$4,000,000, which exceeds the current closure and post-closure cost estimate.

vi. Whenever the current cost estimates increase to an amount greater than the amount of the credit, the permit holder, within 60 days after the increase, must either cause the amount of the credit to be increased so that it at least equals the current closure and post-closure cost estimates and submit evidence of such increase to the Office of Environmental Services, Water and Waste Permits Division, or obtain other financial assurance as specified in this Section to cover the increase. Whenever the current cost estimate decreases, the amount of the credit may be reduced to the amount of the current closure and post-closure cost estimates upon written approval of the administrative authority.

*Response:*

UOP acknowledges this requirement.

vii. Following a determination by the administrative authority that the permit holder has failed to perform final closure or post-closure in accordance with the closure

plan and other permit requirements when required to do so, the administrative authority may draw on the letter of credit.

*Response:*

UOP acknowledges LDEQ's ability to draw on the line of credit in this circumstance.

viii. The wording of the letter of credit shall be identical to the wording that follows, except that the instructions in brackets are to be replaced with the relevant information and the brackets deleted.

#### SOLID WASTE FACILITY

#### IRREVOCABLE LETTER OF CREDIT

Secretary  
Louisiana Department of Environmental Quality  
Post Office Box 4313  
Baton Rouge, Louisiana 70821-4313  
Attention: Office of Environmental Services,  
Water and Waste Permits Division

Dear Sir:

We hereby establish our Irrevocable Standby Letter of Credit No. \_\_\_\_\_ in favor of the Department of Environmental Quality of the state of Louisiana at the request and for the account of [permit holder's or applicant's name and address] for the [closure and/or post-closure] fund for its [list site identification number, site name, facility name, facility permit number] at [location], Louisiana, for any sum or sums up to the aggregate amount of U.S. dollars \$ \_\_\_\_\_ upon presentation of:

1. A sight draft, bearing reference to the Letter of Credit No. \_\_\_\_\_ drawn by the administrative authority, together with;
2. A statement, signed by the administrative authority, declaring that the amount of the draft is payable into the standby trust fund pursuant to the Louisiana Environmental Quality Act, R.S. 30:2001, et seq.

The Letter of Credit is effective as of [date] and will expire on [date], but such expiration date will be automatically extended for a period of at least 1 year on the above expiration date [date] and on each successive expiration date thereafter, unless, at least 120 days before the then-current expiration date, we notify both the administrative authority and [name of permit holder or applicant] by certified mail that we have decided not to extend this Letter of Credit beyond the then-current expiration date. In the event that we give such notification, any unused portion of this Letter of Credit shall be available upon presentation of your sight draft for 120 days after the date of receipt by both the Department of Environmental Quality and [name of permit holder or applicant] as shown on the signed return receipts.

Whenever this Letter of Credit is drawn under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft directly into the standby trust fund of [name of permit holder or applicant] in accordance with the administrative authority's instructions.

Except to the extent otherwise expressly agreed to, the Uniform Customs and Practice for Documentary Letters of Credit (1983), International Chamber of Commerce Publication No. 400, shall apply to this Letter of Credit.

We certify that the wording of this Letter of Credit is identical to the wording specified in LAC 33:VII.727.A.2.g.viii, effective on the date shown immediately below.

[Signature(s) and title(s) of

official(s) of issuing

institution(s)]

[date]

*Response:*

The letter of credit meets these requirements.

**UOP LLC**

25 E. Algonquin Rd.  
Des Plaines, IL 60017-5017

Tel: 847.391.2000

Fax: 847.391.2253

www.uop.com

March 28, 2007

Secretary

Louisiana Department of Environmental Quality

Post Office Box 4313

Baton Rouge, Louisiana 70821-4313

Attention: Office of Environmental Services  
Water and Waste Permits Division

Dear Sir:

UOP LLC has elected to use irrevocable standby letters of credit to demonstrate financial assurance for both the sudden liability coverage during operations as required by LAC 33.VII.727.A.1 as well as the closure and post closure costs of the solid waste surface impoundment at our Shreveport, Louisiana facility as required by LAC 33.VII.727.A.2. Detailed information about this facility includes:

Site EPA ID No.	LAD057109449
	AI# 17846
Site Name	UOP Shreveport Plant
Site Address	8725 Old Mooringsport Road Shreveport, LA 71107
Facility Name	No. 1 Holding Pond
Facility Permit Number	GD-017-0813/P-0182
Current Closure and Post-Closure Cost Estimate	\$3,870,300
Annual Aggregate Amount of Liability Coverage	\$1,000,000

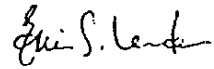
Enclosed you will find the following documents:

- Irrevocable standby letter of credit (for sudden liability coverage – LAC.33.VII.727.A.1.d.ii.(c))
  - Letter No.: SLCWMIL01941
  - Issuing Institution: U.S. Bank, N.A., Milwaukee, Wisconsin
  - Date of Letter: March 20, 2006
  - Amount of Standby Credit: \$1,000,000
- Irrevocable standby letter of credit (for closure and post-closure costs -- LAC.33.VII.727.A.1.d.ii.(c))
  - Letter No.: SLCWMIL01943
  - Issuing Institution: U.S. Bank, N.A., Milwaukee, Wisconsin
  - Date of Letter: March 20, 2006
  - Amount of Standby Credit: \$4,000,000
- Standby Trust Fund (JPMorgan Chase Bank, N.A., trustee)

UOP LLC  
March 28, 2007  
Page 2

If there are any questions, please contact the undersigned at (847) 375-7101.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric S. Leader". The signature is fluid and cursive, with the first name "Eric" being more prominent.

Eric S. Leader  
Leader, Environmental Programs and Compliance  
Honeywell Specialty Materials

Enclosures

cc: S. L. Flanagan  
R. A. Capell

U.S. BANK NATIONAL ASSOCIATION  
INTERNATIONAL DEPARTMENT, MK-WI-J6NI  
777 EAST WISCONSIN AVENUE  
MILWAUKEE, WISCONSIN 53202

SWIFT: USBKUS44MIL  
TELEX: 192179  
TELEPHONE: 414-765-5626  
FACSIMILE: 414-765-4485

IRREVOCABLE STANDBY LETTER OF CREDIT  
NUMBER SLCWMIL01941

MARCH 20, 2006

**BENEFICIARY:**

SECRETARY  
LOUISIANA DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
POST OFFICE BOX 4313  
BATON ROUGE, LOUISIANA 70821-4313  
ATTN: OFFICE OF ENVIRONMENTAL SERVICES,  
WATER AND WASTE PERMITS DIVISION

**APPLICANT:**

UOP LLC  
25 EAST ALGONQUIN ROAD  
DES PLAINES, IL 60017

**AMOUNT:**

USD 1,000,000.00

**DATE AND PLACE OF EXPIRY:**

MARCH 20, 2007

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. SLCWMIL01941 AT THE REQUEST AND FOR THE ACCOUNT OF UOP LLC, 25 EAST ALGONQUIN ROAD, DES PLAINES, ILLINOIS 60017 FOR ITS A1# 17846, UOP SHREVEPORT PLANT, NO. 1 HOLDING POND, PERMIT NUMBER GD-017-0813/P-0182 AT SHREVEPORT, LOUISIANA, IN FAVOR OF ANY GOVERNMENTAL BODY, PERSON, OR OTHER ENTITY FOR ANY SUM OR SUMS UP TO THE AGGREGATE AMOUNT OF USD 1,000,000.00 (ONE MILLION AND 00/100 U.S. DOLLARS) UPON PRESENTATION OF:

1. A FINAL JUDGMENT ISSUED BY A COMPETENT COURT OF LAW IN FAVOR OF A GOVERNMENTAL BODY, PERSON, OR OTHER ENTITY AND AGAINST UOP LLC FOR SUDDEN AND ACCIDENTAL OCCURRENCES FOR CLAIMS ARISING OUT OF INJURY TO PERSONS OR PROPERTY DUE TO THE OPERATION OF THE SOLID WASTE SITE OF UOP LLC AT SHREVEPORT, LOUISIANA AS SET FORTH IN THE LAC 33:VII.727.A.1.
2. A SIGHT DRAFT BEARING REFERENCE TO THE LETTER OF CREDIT NO. SLCWMIL01941 DRAWN BY THE GOVERNMENTAL BODY, PERSON, OR OTHER ENTITY, IN WHOSE FAVOR THE JUDGMENT HAS BEEN RENDERED AS EVIDENCED BY DOCUMENTARY REQUIREMENT IN PARAGRAPH 1.

THE LETTER OF CREDIT IS EFFECTIVE AS OF MARCH 20, 2006 AND WILL EXPIRE ON MARCH 20, 2007, BUT SUCH EXPIRATION DATE WILL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF AT LEAST ONE (1) YEAR ON THE ABOVE EXPIRATION DATE, MARCH 20, 2007, AND ON EACH SUCCESSIVE EXPIRATION DATE THEREAFTER, UNLESS, AT LEAST ONE HUNDRED TWENTY (120) DAYS BEFORE THE THEN-CURRENT EXPIRATION DATE, WE NOTIFY BOTH THE ADMINISTRATIVE AUTHORITY AND UOP LLC BY CERTIFIED MAIL THAT WE HAVE DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE THEN-CURRENT EXPIRATION DATE. IN THE EVENT WE GIVE SUCH NOTIFICATION, ANY

CONTINUED ON PAGE TWO

PAGE TWO

IRREVOCABLE STANDBY LETTER OF CREDIT  
NO. SLCWMIL01941

UNUSED PORTION OF THIS LETTER OF CREDIT SHALL BE AVAILABLE UPON PRESENTATION OF YOUR SIGHT DRAFT FOR ONE HUNDRED TWENTY (120) DAYS AFTER THE DATE OF RECEIPT BY BOTH THE DEPARTMENT OF ENVIRONMENTAL QUALITY AND UOP LLC AS SHOWN ON THE SIGNED RETURN RECEIPTS.

WHENEVER THIS LETTER OF CREDIT IS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US, AND WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTLY INTO THE STANDBY TRUST FUND OF UOP LLC IN ACCORDANCE WITH THE ADMINISTRATIVE AUTHORITY'S INSTRUCTIONS.

EXCEPT TO THE EXTENT OTHERWISE EXPRESSLY AGREED TO, THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS, (1993 REVISION), INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION NO. 500, SHALL APPLY TO THIS LETTER OF CREDIT.

WE CERTIFY THAT THE WORDING OF THIS LETTER OF CREDIT IS IDENTICAL TO THE WORDING SPECIFIED IN LAC 33:VII.727.A.1.d.ii.(e), EFFECTIVE ON THE DATE IMMEDIATELY SHOW BELOW

U.S. BANK NATIONAL ASSOCIATION



KAY BREMSER

TITLE: ASSISTANT VICE PRESIDENT

DATE: MARCH 20, 2006

U.S. BANK NATIONAL ASSOCIATION  
INTERNATIONAL DEPARTMENT, MK-WI-J6NI  
777 EAST WISCONSIN AVENUE  
MILWAUKEE, WISCONSIN 53202

SWIFT: USBKUS44MIL  
TELEX: 192179  
TELEPHONE: 414-765-5626  
FACSIMILE: 414-765-4485

IRREVOCABLE STANDBY LETTER OF CREDIT  
NUMBER SLCWMIL01943

MARCH 20, 2006

**BENEFICIARY:**

SECRETARY  
LOUISIANA DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
POST OFFICE BOX 4313  
BATON ROUGE, LOUISIANA 70821-4313  
ATTN: OFFICE OF ENVIRONMENTAL SERVICES,  
WATER AND WASTE PERMITS DIVISION

**APPLICANT:**

UOP LLC  
25 EAST ALGONQUIN ROAD  
DES PLAINES, IL 60017

**AMOUNT:**

USD 4,000,000.00

**DATE AND PLACE OF EXPIRY:**

MARCH 20, 2007

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. SLCWMIL01943 IN FAVOR OF THE DEPARTMENT OF ENVIRONMENTAL QUALITY OF THE STATE OF LOUISIANA AT THE REQUEST AND FOR THE ACCOUNT OF UOP LLC, 25 EAST ALGONQUIN ROAD, DES PLAINES, ILLINOIS 60017 FOR THE CLOSURE AND POST-CLOSURE FUND FOR ITS A1# 17846, UOP SIHREVEPORT PLANT, NO. 1 HOLDING POND, PERMIT NUMBER GD-017-0813/P-0182 AT SIHREVEPORT, LOUISIANA, FOR ANY SUMS UP TO THE AGGREGATE AMOUNT OF USD 4,000,000.00 (FOUR MILLION AND 00/100 U.S. DOLLARS) UPON PRESENTATION OF:

1. A SIGHT DRAFT, BEARING REFERENCE TO THE LETTER OF CREDIT NO. SLCWMIL01943 DRAWN BY THE ADMINISTRATIVE AUTHORITY, TOGETHER WITH;
2. A STATEMENT SIGNED BY THE ADMINISTRATIVE AUTHORITY, DECLARING THAT THE AMOUNT OF THE DRAFT IS PAYABLE INTO THE STANDBY TRUST FUND PURSUANT TO THE LOUISIANA ENVIRONMENTAL QUALITY ACT, R.S. 30:2001, ET SEQ.

THE LETTER OF CREDIT IS EFFECTIVE AS OF MARCH 20, 2006 AND WILL EXPIRE ON MARCH 20, 2007, BUT SUCH EXPIRATION DATE WILL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF AT LEAST ONE (1) YEAR ON THE ABOVE EXPIRATION DATE, MARCH 20, 2007, AND ON EACH SUCCESSIVE EXPIRATION DATE THEREAFTER, UNLESS, AT LEAST ONE HUNDRED TWENTY (120) DAYS BEFORE THE THEN-CURRENT EXPIRATION DATE, WE NOTIFY BOTH THE ADMINISTRATIVE AUTHORITY AND UOP LLC BY CERTIFIED MAIL THAT WE HAVE DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE THEN-CURRENT EXPIRATION DATE. IN THE EVENT WE GIVE SUCH NOTIFICATION, ANY

CONTINUED ON PAGE TWO

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IRREVOCABLE STANDBY LETTER OF CREDIT  
NO. SLCWMIL01943

UNUSED PORTION OF THIS LETTER OF CREDIT SHALL BE AVAILABLE UPON PRESENTATION OF YOUR SIGHT DRAFT FOR ONE HUNDRED TWENTY (120) DAYS AFTER THE DATE OF RECEIPT BY BOTH THE DEPARTMENT OF ENVIRONMENTAL QUALITY AND UOP LLC AS SHOWN ON THE SIGNED RETURN RECEIPTS.

WHENEVER THIS LETTER OF CREDIT IS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US, AND WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTLY INTO THE STANDBY TRUST FUND OF UOP LLC IN ACCORDANCE WITH THE ADMINISTRATIVE AUTHORITY'S INSTRUCTIONS.

EXCEPT TO THE EXTENT OTHERWISE EXPRESSLY AGREED TO, THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS, (1993 REVISION), INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION NO. 500, SHALL APPLY TO THIS LETTER OF CREDIT.

WE CERTIFY THAT THE WORDING OF THIS LETTER OF CREDIT IS IDENTICAL TO THE WORDING SPECIFIED IN I.A.C. 33:VII.727.A.2.g.viii, EFFECTIVE ON THE DATE IMMEDIATELY SHOW BELOW

U.S. BANK NATIONAL ASSOCIATION

  
KAY BREMSER

TITLE: ASSISTANT VICE PRESIDENT

DATE: MARCH 20, 2006

A/C No.: 10225919.1

Account Name: UOP LLC SW Pond Liability Coverage Standby Trust

UOP LLC

25 East Algonquin Road

Des Plaines, IL 60017

March 28, 2006

Please note that the following indemnities shall be applied to the Agreement signed on March 28, 2006 by and between UOP LLC, a Delaware limited liability company ("Owner") and JPMorgan Chase Bank, N.A. ("Trustee").

The Trustee may rely and shall be protected in acting or refraining from acting upon any written notice, instruction or request furnished to it hereunder and believed by it to be genuine and to have been signed or presented by the proper party or parties. The Trustee shall be under no duty to inquire into or investigate the validity, accuracy or content of any such document. The Trustee shall have no duty to solicit any payments which may be due it hereunder.

The Trustee shall not be liable for any action taken or omitted by it in good faith unless a court of competent jurisdiction determines that the Trustee's willful misconduct was the primary cause of any loss to the Owner. In the administration of the Agreement hereunder, the Trustee may execute any of its powers and perform its duties hereunder directly or through agents or attorneys and may, consult with counsel, accountants and other skilled persons to be selected and retained by it. The Trustee shall not be liable for anything done, suffered or omitted in good faith by it in accordance with the advice or opinion of any such counsel, accountants or other skilled persons.

The Owner hereby agrees to (i) pay the Trustee upon execution of the Agreement reasonable compensation for the services to be rendered hereunder, as described in Schedule I attached hereto, and (ii) pay or reimburse the Trustee upon request for all expenses, disbursement and advances, including reasonable attorney's fees, incurred or made by it in connection with the preparation, execution, performance, delivery modification and termination of the Agreement.

During the term of this Escrow Agreement, the Escrow Fund may be invested by the Escrow Agent in (a) a JPMorgan Chase Bank, N.A. money market account, (b) a trust account with JPMorgan Chase Bank, N.A. or (c) a money market mutual fund (separately specified in writing), including without limitation a JPMorgan fund or any other mutual fund for which the Escrow Agent

or any affiliate of the Escrow Agent serves as investment manager, administrator, shareholder servicing agent and/or custodian or subcustodian, notwithstanding that (i) the Escrow Agent or an affiliate of the Escrow Agent receives fees from such funds for services rendered, (ii) the Escrow Agent charges and collects fees for services rendered pursuant to this Escrow Agreement, which fees are separate from the fees received from such funds, and (iii) services performed for such funds and pursuant to this Escrow Agreement may at times duplicate those provided to such funds by the Escrow Agent or its affiliates; or such other investments as shall be directed in writing by the Purchaser and the Seller and as shall be acceptable to the Escrow Agent. Such written instructions, if any, referred to in the foregoing sentence shall specify the type and identity of the investments to be purchased and/or sold and will be executed through JPMorgan Asset Management (JPMAM), in the investment management division of JPMorgan Chase. Unless otherwise instructed in writing by the Parties, Escrow Agent shall invest the Escrow Fund in selection (b) above.

Subject to principles of best execution, transactions shall be effected on behalf of the Escrow Fund through broker-dealers selected by JPMAM. In this regard, JPMAM seeks to attain the best overall result for the Escrow Fund, taking into consideration quality of service and reliability. An agency fee will be assessed in connection with each transaction. The Escrow Agent shall have the right to liquidate any investments held in order to provide funds necessary to make required payments under this Escrow Agreement. The Escrow Agent shall have no liability for any loss sustained as a result of any investment in an investment made pursuant to the terms of this contract or as a result of any liquidation of any investment prior to its maturity or for the failure of the parties to give the Escrow Agent instructions to invest or reinvest the Escrow Fund. Receipt, investment and reinvestment of the Escrow Deposit shall be confirmed by Escrow Agent as soon as practicable by account statement, and any discrepancies in any such account statement shall be noted by Parties to Escrow Agent within 30 calendar days after receipt thereof. Failure to inform Escrow Agent in writing of any discrepancies in any such account statement within said 30-day period shall conclusively be deemed confirmation of such account statement in its entirety.

The Owner hereby agrees to indemnify the Trustee for, and to hold it harmless against any loss, liability or expense arising out of or in connection with the Agreement and carrying out its duties hereunder, including the costs and expenses of defending itself against any claim of liability, except in those cases where the Trustee has been guilty of gross negligence or willful misconduct.

The duties and responsibilities of the Trustee hereunder shall be determined solely by the express provisions of this Agreement, and no other or further duties or responsibilities shall be implied. The Trustee shall not have any liability under, nor duty to inquire into the terms and provisions of any agreement or instructions, other than outlined in the Agreement. Trustee may rely on, and shall not be liable for acting or refraining from acting in accordance with, any written notice, instruction or

request or other paper furnished to it hereunder or pursuant hereto and believed by it to have been signed or presented by the proper party or parties. Trustee shall be responsible for holding, investing, reinvesting and disbursing the deposit pursuant to this Agreement; provided, however, in no event shall the Trustee be liable for special, indirect or consequential loss or damage of any kind whatsoever (including but not limited to lost profits), even if the Trustee has been advised of the likelihood of such loss or damage and regardless of the form of action. Trustee is not responsible or liable in any manner whatsoever for the sufficiency, correctness, genuineness or validity of the subject matter of this Escrow Agreement or any part hereof or for the transaction or transactions requiring or underlying the execution of this Agreement, the form or execution hereof or for the identity or authority of any person executing this Agreement or any part hereof or depositing the deposit.

In the event that the Trustee shall be uncertain as to its duties or rights relative to the Agreement or shall receive instructions, claims or demands from any party which, in its opinion, conflict with any of the provisions of the Agreement, it shall be entitled to refrain from taking any action and its sole obligation shall be to keep safely all property held in trust until it shall be directed otherwise in writing by all of the other parties hereto or by a final order or judgment of a court of competent jurisdiction.

Any corporation into which the Trustee in its individual capacity may be merged or converted or with which it may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Trustee in its individual capacity shall be a party, or any corporation to which substantially all the corporate trust business of the Trustee in its individual capacity may be transferred, shall be the Trustee under the Agreement without further act.

It will be the responsibility of the Owner and/or Department of Environmental Quality of the State of Louisiana to notify The Trustee upon termination of the Escrow Account, so that the Escrow Account can be closed on the books of the Trustee. This will insure that subsequent invoices will not go out to the Owner, and we can close the account on the Bank's books. All signatures of the parties to this Agreement may be transmitted by facsimile, and such facsimile will, for all purposes, be deemed to be the original signature of such party whose signature it reproduces, and will be binding upon such party.

Any notice or other communication required or permitted to be given under this Escrow Agreement by any party hereto to any other party hereto shall be considered as properly given if in writing and (a) delivered against receipt therefor, (b) mailed by registered or certified mail, return receipt requested and postage prepaid or (c) sent by telefax machine, in each case to the address or telefax number, as the case may be, set forth below:

If to Trustee:

JPMorgan Chase Bank, N.A.  
600 Travis Street, 53rd Floor  
Houston, TX 77002  
Attn: Ruth Chipongian  
ITS/Escrow Section  
Telefax No.: (713) 216-6927

If to Owner:

UOP LLC  
25 East Algonquin Road  
Des Plaines, IL 60017-5017  
Attn: Vice President & Chief Financial Officer  
Telefax No.: (847) 391-2253  
Telephone No.: (847) 391-2000

Receipt, investment and reinvestment of the funds shall be confirmed by Trustee as soon as practicable by account statement, and any discrepancies in any such account statement shall be noted by Owner to Trustee within 30 calendar days after receipt thereof. Failure to inform Trustee in writing of any discrepancies in any such account statement within said 30-day period shall conclusively be deemed confirmation of such account statement in its entirety. For purposes of this paragraph, (a) each account statement shall be deemed to have been received by the party to whom directed on the earlier to occur of (i) actual receipt thereof and (ii) three "Business Days" (hereinafter defined) after the deposit thereof in the United States Mail, postage prepaid and (b) the term "Business Day" shall mean any day of the year, excluding Saturday, Sunday and any other day on which national banks are required or authorized to close in Houston, Texas.

The Trustee may resign and be discharged from its duties or obligations hereunder by giving 10 days advance notice in writing of such resignation to Owner specifying a date when such resignation shall take effect. The Trustee shall have the right to withhold an amount equal to any amount due and owing to the Trustee, plus any costs and expenses the Trustee shall reasonably believe may be incurred by the Trustee in connection with the termination of the Escrow Agreement. Any corporation or association into which the Trustee may be merged or converted or with which it may be consolidated, or any corporation or association to which all or substantially all the escrow business of the Trustee's corporate trust line of business may be transferred, shall be the Trustee under this Escrow Agreement without further act. Trustee's sole responsibility after such 10-day notice period expires shall be to hold the deposit (without any obligation to reinvest the same) and to deliver the same to a designated substitute Trustee, if any, or in accordance with the directions of a final order or judgment of a court of competent jurisdiction, at which time of delivery Trustee's obligations hereunder shall cease and terminate. If Owner have failed to

appoint a successor Trustee prior to the expiration of ten (10) days following receipt of the notice of resignation, the Trustee may petition any court of competent jurisdiction for the appointment of a successor Trustee or for other appropriate relief, and any such resulting appointment shall be binding upon all of the parties hereto.

#### IMPORTANT INFORMATION ABOUT PROCEDURES FOR OPENING A NEW ACCOUNT

For accounts opened in the US:

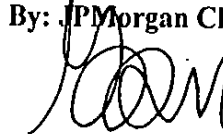
To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify, and record information that identifies each person who opens an account. When an account is opened, the Trustee will ask for information that will allow us to identify relevant parties.

TINs. Tax Matters. The Owner each represent that its correct Taxpayer Identification Number ("TIN") assigned by the Internal Revenue Service ("IRS") or any other taxing authority is set forth on the signature page hereof. Trustee shall report to the Internal Revenue Service or such other authority such earnings as it deems appropriate or as required by any applicable law or regulation or, to the extent consistent therewith to Owner. In addition, Trustee shall withhold any taxes it deems appropriate and shall remit such taxes to the appropriate authorities. Any tax returns or reports required to be prepared and filed on behalf of or by the Trust will be prepared and filed by Owner, as applicable, and the Trustee shall have no responsibility for the preparation and/or filing or any tax return with respect to any income earned by the Trust. In addition, any tax or other payments required to be made pursuant to such tax return or filing will be paid by Owner, as appropriate. Trustee shall have no responsibility for such payment unless directed to do so Owner.

Security Procedures. In the event funds transfer instructions are given (other than in writing at the time of execution of this agreement, as indicated in this agreement), whether in writing or by telecopier, the Trustee is authorized to seek confirmation of such instructions by telephone call-back to the person or persons designated on schedule 2 hereto ("Schedule 2"), and the Trustee may rely upon the confirmation of anyone purporting to be the person or persons so designated. Each funds transfer instruction shall be executed by an authorized signatory, a list of such authorized signatories is set forth on Schedule 2. The undersigned is authorized to certify that the signatories on Schedule 2 are authorized signatories. The persons and telephone numbers for call-backs may be changed only in a writing actually received and acknowledged by the Trustee. If the Trustee is unable to contact any of the authorized representatives identified in Schedule 2, the Trustee is hereby authorized to seek confirmation of such instructions by telephone call-back to any one or more of your executive officers, ("Executive Officers"), which shall include the titles of President & Chief Executive Officer, Vice President & Chief Financial Officer, and

any Vice President, as the Trustee may select. Such "Executive Officer" shall deliver to the Trustee a fully executed Incumbency Certificate, and the Trustee may rely upon the confirmation of anyone purporting to be any such officer. The Trustee and the beneficiary's bank in any funds transfer may rely solely upon any account numbers or similar identifying numbers provided by the Owner to identify (i) the beneficiary, (ii) the beneficiary's bank, or (iii) an intermediary bank. The Trustee may apply any of the escrowed funds for any payment order it executes using any such identifying number, even when its use may result in a person other than the beneficiary being paid, or the transfer of funds to a bank other than the beneficiary's bank or an intermediary bank designated. The parties to this agreement acknowledge that these security procedures are commercially reasonable.

By: JPMorgan Chase Bank, N.A.



Name: Greg Campbell  
Title: Vice President

Tax Certification: Taxpayer ID#:

363594439

NOTE: The following certification shall be used by and for a U.S. resident only. Non-residents must use and provide Form W8-BEN

Customer is a (check one):

☐ Corporation      ☐ Municipality      ☐ Partnership      ☐ Non-profit or Charitable Org  
☐ Individual      ☐ REMIC      ☐ Trust      ☒ Other Limited Liability Company

*Under the penalties of perjury, the undersigned certifies that:*

- (1) *the entity is organized under the laws of the United States*
- (2) *the number shown above is its correct Taxpayer Identification Number (or it is waiting for a number to be issued to it); and*
- (3) *it is not subject to backup withholding because: (a) it is exempt from backup withholding or (b) it has not been notified by the Internal Revenue Service (IRS) that it is subject to backup withholding as a result of failure to report all interest or dividends, or (c) the IRS has notified it that it is no longer subject to backup withholding.*

*(If the entity is subject to backup withholding, cross out the words after the (3) above.)*

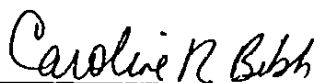
*Investors who do not supply a tax identification number will be subject to backup withholding in accordance with IRS regulations.*

**Note: The IRS does not require your consent to any provision of this document other than the certifications required to avoid backup withholding.**

Agreed by Owner:

UOP LLC

BY



Name: Caroline R. Bibb

Title: Senior Vice President—

Catalysts, Adsorbents & Specialties

## SCHEDULE I



### Schedule of Fees for Trust Services

New Account Acceptance Fee ..... \$ 750 Waived  
Payable upon Account Opening

Minimum Administrative Fee ..... \$ 2,000  
Payable Upon Account Opening and in Advance  
for each year in which we act as Trustee

#### ACTIVITY FEES:

##### Disbursements

Per Check		\$	35
Per Wire	U.S.	\$	35
	International	\$	100

##### Receipts

Per Check	\$	35
Per Wire	\$	35

##### Investments

Per directed buy/sell)	\$	50
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1099 Reporting	\$	15
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#### LEGAL EXPENSES: At Cost

There will be no legal expense for Chase if Chase's standard form agreement is employed without substantive amendments.

A New Account Acceptance Fee will be charged for the Bank's review of the Agreement along with any related account documentation. A one (1) year Minimum Administrative Fee will be assessed for any account which is funded. The account will be invoiced in the month in which the account is opened and annually thereafter. Payment of the invoice is due 30 days following receipt.

The Administrative Fee will cover a maximum of fifteen (15) annual administrative hours for the Bank's standard Trust services including account setup, safekeeping of assets, investment of funds, collection of income and other receipts, preparation of statements comprising account activity and asset listing, and distribution of assets in accordance with the specific terms of the Agreement.

***Extraordinary Services and Out-of Pocket Expenses:***

Any additional services beyond our standard services as specified above, such as annual administrative activities in excess of fifteen (15) hours and all reasonable out-of-pocket expenses including attorney's fees will be considered extraordinary services for which related costs, transaction charges, and additional fees will be billed at the Bank's standard rate.

***Modification of Fees:***

Circumstances may arise necessitating a change in the foregoing fee schedule. The Bank will attempt at all times, however, to maintain the fees at a level which is fair and reasonable in relation to the responsibilities assumed and the duties performed.

***Assumptions:***

- The account will be invoiced in the month in which the account is opened and annually thereafter.
- Payment of the invoice is due 30 days following receipt.

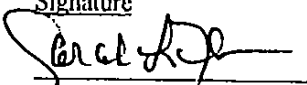
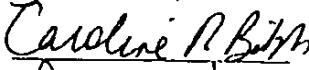
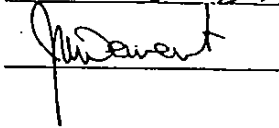
All fees quoted are subject to our review and acceptance, and that of our legal counsel, of the documents governing the escrow. As a condition for acceptance of an appointment, it is expected that all legal fees and out-of-pocket expenses incurred by JP Morgan Chase Bank and our counsel in connection with our review of the transaction will be paid by the client regardless of whether or not the transaction closes.

To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify, and record information that identifies each person who opens an account. What this means for you: When you open an account, we *will* ask for your name, address, date of birth (for individuals), and other information that will allow us to identify you. We may also ask to see your driver's license or other identifying documents.

## Schedule 2

**Telephone Number(s) for Call-Backs and  
Person(s) Designated to Give and Confirm Funds Transfer Instructions**

If to Owner:

<u>Name</u>	<u>Telephone Number</u>	<u>Signature</u>
1. Sarah L. Flanagan	(847) 391-3032	
2. Caroline R. Bibb	(847) 391-3485	
3. James R. Dement	(847) 391-3777	

All funds transfer instructions must include the signature of the person(s) authorizing said funds transfer and must not be the same person confirming said transfer. All funds transfer instructions must include the signature of the person(s) authorizing said funds transfer and must not be the same person confirming said transfer.

## Standby Trust Agreement

Trust Agreement, the "Agreement," entered into as of March 28, 2006 by and between UOP LLC, a Delaware limited liability company, the "Grantor," and JPMorgan Chase Bank, N.A., the "Trustee."

WHEREAS, the Department of Environmental Quality of the State of Louisiana, an agency of the State of Louisiana, has established certain regulations applicable to the grantor, requiring that an owner or operator of a hazardous waste management facility shall provide assurance that funds will be available when needed for closure and/or post-closure care of the facility;

WHEREAS, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the facility identified herein;

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this agreement, and the Trustee is willing to act as trustee.

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

### Section 1. Definitions

As used in this agreement:

- (a) The term *Grantor* means the owner or operator who enters into this Agreement and any successors or assigns of the Grantor.
- (b) The term *Trustee* means the Trustee who enters into this Agreement and any successor Trustee.
- (c) The term *Secretary* means the Secretary, Louisiana Department of Environmental Quality and any successor agency.
- (d) The term *administrative authority* means the Secretary, or a person designated by him or her to act therefor.

### Section 2. Identification of Facilities and Cost Estimates

This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

### Section 3. Establishment of Fund

The Grantor and the Trustee hereby establish a trust fund, the "Fund," for the benefit of the Louisiana Department of Environmental Quality. The Grantor and the Trustee intend that no third party have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by the administrative authority.

### Section 4. Payment for Closure and Post-Closure Care

The Trustee shall make payments from the Fund as the administrative authority shall direct, in writing, to provide for the payment of the costs of closure and/or post-closure care of the facility covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the administrative authority from the Fund for closure and post-closure expenditures in such amounts as the administrative authority shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the administrative authority specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

### Section 5. Payments Comprising the Fund

Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

### Section 6. Trustee Management

The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this part. In investing, reinvesting, exchanging, selling, and managing the Fund, the trustee shall discharge his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims, except that:

A. securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2 (a), shall not be acquired or held, unless they are securities or other obligations of the federal or a state government;

B. the Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government; and

C. the Trustee is authorized to hold cash awaiting investment or distribution uninvested for a reasonable time and without liability for the payment of interest thereon.

### Section 7. Commingling and Investment

The Trustee is expressly authorized in its discretion:

A. to transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

B. to purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1 et seq., including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

#### Section 8. Express Powers of Trustee

Without in any way limiting the powers and discretion conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

A. to sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition;

B. to make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

C. to register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve bank, but the books and records of the Trustee shall at all times show that all such securities are part of the Fund;

D. to deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State government; and

E. to compromise or otherwise adjust all claims in favor of or against the Fund.

#### Section 9. Taxes and Expenses

All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

#### Section 10. Annual Valuation

The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the administrative authority a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and the administrative authority shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

#### Section 11. Advice of Counsel

The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any question arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

#### Section 12. Trustee Compensation

The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

#### Section 13. Successor Trustee

The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, the administrative authority, and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Part shall be paid as provided in Section 9.

#### Section 14. Instructions to the Trustee

All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Exhibit A or such other designees as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests and instructions. All orders, requests, and instructions by the administrative authority to the Trustee shall be in writing, signed by the administrative authority, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or administrative authority hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or administrative authority, except as provided for herein.

#### Section 15. Notice of Nonpayment

The Trustee shall notify the Grantor and the administrative authority, by certified mail, within ten days following the expiration of the thirty-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

#### Section 16. Amendment of Agreement

This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist.

#### Section 17. Irrevocability and Termination

Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to Grantor.

#### Section 18. Immunity and Indemnification

The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any directions by the Grantor or the administrative authority issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

#### Section 19. Choice of Law

This Agreement shall be administered, construed, and enforced according to the laws of the State of Louisiana.

#### Section 20. Interpretation

As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their respective officers duly authorized and their corporate seals to be hereunto affixed and attested as of the date first above written. The parties below certify that the wording of this Agreement is identical to the wording specified in LAC 33:V.3719.A.1 as such regulations were constituted on the date first above written.

GRANTOR:  
UOP LLC

By: Caroline R. Bibb

Its: Senior Vice President—Catalysts, Adsorbents & Specialties

WITNESS:

Michael Vanderkhan  
(SEAL)

WITNESS:

Guo S. Li  
(SEAL)

TRUSTEE:  
JPMORGAN CHASE BANK, N.A.

By: [Signature]

Its: Vice President

WITNESS:

May Ng  
(SEAL)

WITNESS:

[Signature]  
(SEAL)

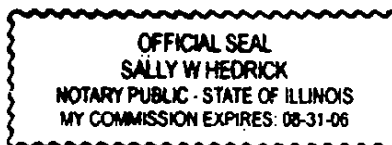
STATE OF ILLINOIS  
COUNTY OF COOK

BE IT KNOWN, that on this 27 day of March, 2006, before me, the undersigned Notary Public, duly commissioned and qualified within the State and County aforesaid, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared Caroline R. Bibb, to me well known, who declared and acknowledged that she had signed and executed the foregoing instrument as her act and deed, and as the act and deed of the UOP LLC, a limited liability company, for the consideration, uses and purposes and on terms and conditions therein set forth.

And the said appearer, being by me first duly sworn, did depose and say that she is the Senior Vice President—Catalysts, Adsorbents & Specialties of said company and that she signed and executed said instrument in her said capacity, and under authority of the Board of Managers of said company.

Thus done and passed in the State and County aforesaid, on the day and date first hereinabove written, and in the presence of Michael Van de Kerckhove and Eric S. Leader, competent witnesses, who have hereunto subscribed their names as such, together with said appearer and me, said authority, after due reading of the whole.

Sally W. Hedrick  
NOTARY PUBLIC



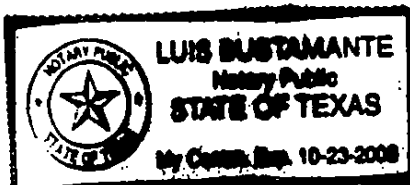
STATE OF  
COUNTY OF

BE IT KNOWN, that on this 28 day of March, 2006, before me, the undersigned Notary Public, duly commissioned and qualified within the State and County aforesaid, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared Greg Campbell to me well known, who declared and acknowledged that he had signed and executed the foregoing instrument as his act and deed, and as the act and deed of the JPMorgan Chase Bank, a National Association, for the consideration, uses and purposes and on terms and conditions therein set forth.

And the said appearer, being by me first duly sworn, did depose and say that he is the Vice President of said company and that he signed and executed said instrument in his said capacity, and under authority of the Board of Directors of said bank.

Thus done and passed in the State and County aforesaid, on the day and date first hereinabove written, and in the presence of May Ng and Luis Bustamante, competent witnesses, who have hereunto subscribed their names as such, together with said appearer and me, said authority, after due reading of the whole.

[Signature]  
NOTARY PUBLIC



## Schedule A


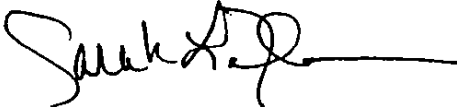
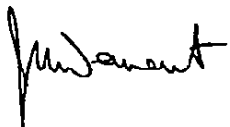
Site EPA ID No.	LAD057109449
	AI# 17846
Site Name	UOP Shreveport Plant
Site Address	8725 Old Mooringsport Road Shreveport, LA 71107
Facility Name	No. 1 Holding Pond
Facility Permit Number	GD-017-0813/P-0182
Current Closure and Post-Closure Cost Estimate	\$3,870,300
Annual Aggregate Amount of Liability Coverage	\$1,000,000

## **Schedule B**

This Agreement is not presently funded, but shall be funded by the irrevocable standby letters of credit number SLCWMIL01941 and SLCWMIL01943 issued by U.S. Bank, N.A. used by the Grantor in accordance with the terms of those documents.

**Exhibit A**

The following persons are authorized to act on behalf of the guarantor:

Caroline R. Bibb Sr. Vice President, CA&S	
Sarah L. Flanagan Vice President & Chief Financial Officer	
James R. Dement Director, Health, Safety and Environmental	

**AMENDMENT TO STANDBY TRUST AGREEMENT  
TO BE INSERTED IN  
APPENDIX K  
OF THE  
SOLID WASTE PERMIT RENEWAL APPLICATION  
BEHIND THE STANDBY TRUST AGREEMENT**



Except as provided in this Amendment, the terms of the Agreement are in full force and effect.

Dated this 20 day of August, 2008.

ATTEST:

By:

Caroline R. Bibb  
Caroline Bibb

Senior Vice President-Catalysts, Adsorbents & Specialties

(Seal)

ATTEST:

By:

Paul Gilliam  
(Signature of Trustee)

PAUL GILLIAM  
TRUST OFFICER

(Title)

(Title)

ACCEPTED AND AGREED TO THIS 30 day of September, 2008.

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

By:

Danilo Lewis, Accountant Administrator  
(Louisiana DEQ Contact)

**APPENDIX I**  
**OPERATIONAL PLAN**

**F I N A L**

## **APPENDIX L**

# **OPERATIONAL PLAN NO. 1 POND**

*Prepared for*  
UOP  
Shreveport, Louisiana

June 1, 2006

File No. 19227778.00001

# **URS**

URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, Louisiana 70806  
225/922-5700

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## ATTACHMENTS

### Attachment 1 Wastewater and Sludge Profile

Table 1 No. 1 Pond Influent Analytical Summary

Table 2 Solid Waste (Sludge) Analytical Results

Figure 1 Wastewater and Solid Waste Sampling Locations  
No. 1 Holding Pond

### Attachment 2 Training Outline

UOP owns and operates a catalyst manufacturing and regeneration facility near Blanchard, Louisiana in Caddo Parish, approximately 15 miles northwest of Shreveport, Louisiana. The location of the Shreveport Plant is shown in Figure 1 of the Mandatory Modification Document.

The entire plant is fenced to prevent unauthorized ingress or egress, except by willful entry. Entrance is gained primarily through the UOP entry gate, which is monitored by a video camera. All visitors must check in with the security guard and are not allowed access to the process areas or outlying areas unless accompanied by a UOP employee. The security guard is on duty 24 hours per day.

At the Shreveport Plant, UOP operates a surface impoundment, the No. 1 Pond, subject to the Louisiana Solid Waste Regulations. The No. 1 Pond is located approximately ½ mile northwest of the UOP process area, as shown in Figure 7 of the Mandatory Modification Document. The No. 1 Pond is an existing unit and has been in service as part of the Shreveport Plant wastewater treatment system since approximately 1965. Traffic in the area is restricted to UOP personnel directly involved with the operation and maintenance of the No. 1 Pond.

The No. 1 Pond is approximately 1,000 feet by 800 feet by 10 feet deep at its deepest point. The No. 1 Pond covers an area of approximately 8 acres and has a capacity of approximately 24 million gallons. The pond serves primarily as a surge pond for recycle water and secondarily as a solids settling pond.

The UOP wastewater treatment system operates continuously. During 2005, the total flow to (influent) the No. 1 Pond was 48,670,405 gallons. The total flow from the No. 1 Pond was 49,037,787 gallons during 2005. Because of the continuous operation of the wastewater treatment system, the wastewater is withdrawn so that the net flow to the No. 1 Pond is approximately zero over any one-year time period.

The No. 1 Pond is used only for storage of recycle water for the UOP Shreveport Plant. Recycle water is water from various wastestreams prior to treatment in the Recycle Water Treatment system. Recycle water is not wastewater until it has been through the Recycle Water Treatment system. The bottoms from the recycle treatment system are pumped down injection wells as brine. The balance of the water is usable in the process.

Based on water and sludge analyses, the waste sent to the No. 1 Pond is nonhazardous. Recycle water is the only material discharged to the holding pond. The recycle water held in the pond is non-flammable and non-explosive. No biological treatment is conducted in the No. 1 Pond.

The primary source of recycle water entering the No. 1 Pond is process wastewater. Other sources of recycle water entering the No. 1 Pond are boiler blowdown, cooling tower blowdown, wastewater from the septic tank drains, and stormwater from certain curbed areas within the plant.

The recycle water quality changes due to rainfall and varying plant operating conditions; the quality of the process wastewater will vary depending on the different grades of catalyst produced, varying production rates, etc. The range of constituent concentrations of the wastestream entering the No. 1 Pond is summarized in Attachment 1 of this Operational Plan. Results of sludge analyses are also included in Attachment 1. Recycle water is analyzed once per day in the wastewater treatment plant.

Based on the above analysis, recycle water entering the No. 1 Pond is an aqueous stream with varying amounts of chlorides, sodium, sulfates, ammonia (mostly as ammonium chloride), and calcium. The recycle water also contains suspended solids, mostly alumina catalyst prill fines resulting from the catalyst washing operation.

The influent to the No. 1 Pond is monitored for the flow rate and the pH of the wastewater.

The No. 1 Pond was constructed for the exclusive use of UOP plant operations for the management of nonhazardous process wastewater.

The No. 1 Pond does not receive any of the following materials:

- Hazardous waste;
- Industrial solid waste except as described above;
- Nonhazardous petroleum-contaminated media;
- Incinerator ash;
- PCB waste; or
- Other unauthorized or unpermitted solid waste.

The operational standards for waste testing that apply to the No. 1 Pond are those for industrial solid waste. Through a combination of process knowledge, raw-materials knowledge, and analytical results including TCLP analyses conducted in 2006, UOP demonstrates that the influent wastewater and the No. 1 Pond sludges are not RCRA hazardous. Salvaging is prohibited, except for recovery of floating oil that is conducted periodically. This material is skimmed from the surface of the pond and sent off-site for recycling.

Even though the waste handled in the pond is not amendable to scavenging, scavenging is prohibited.

Open burning is not practiced at the No. 1 Pond and the wastewater is not flammable.

UOP's Spill Prevention Control and Countermeasure Plan (SPCC Plan) includes provisions to minimize the possibility of hazardous substances, oils and other materials entering the wastewater system. Retaining walls and containment dikes to prevent contamination of the recycle water with hazardous substances or oils have been installed.

The type of waste generated is classified as Non-hazardous Industrial Solid Waste. The wastes consist of wastewater with suspended solids. Approximately 90 percent of the total recycle water flow (270 gpm) is generated by the catalyst manufacturing units. In these units, alumina catalyst prills (produced for the petroleum refining industry) are formed in an oil solution. After the prills are formed and aged, they are washed with deionized water to remove chlorides. Following the wash cycle, the wash water, now called "spent" wash water, is discharged into the recycle water collection system and subsequently pumped to the recycle water recovery system. In the event of recycle water recovery unit outages, the recycle water is pumped to the holding pond approximately ½ mile northwest of the process area. Other effluent entering the collection system includes boiler blowdown, cooling tower blowdown, sanitary drains from the septic tank drains and storm water from certain curbed areas within the plant. The waste management process is described in greater detail below.

Wastewater generated by the manufacturing operation normally goes directly to the on-site recycle water recovery unit. In the recycle water recovery unit, solids (mostly alumina) are dewatered on a belt press, dried in a sludge-dryer, then containerized and disposed off site as an industrial solid waste. Following dewatering, up to 90 percent of the belt press liquid effluent is recovered for reuse by evaporation/condensation. Typically, evaporator bottoms (brine) go directly to UOP's permitted injection wells.

The recycle water holding pond is necessary, however, for events of recycle water recovery unit outages, disposal well outages and periods of heavy rainfall (rainfall in designated curbed processing areas is also handled as recycle water). During such events, recycle water goes directly to the holding pond where it is contained until it can be returned to the recovery unit for processing.

As shown in Figure 7 of the Mandatory Modification Document, the No. 1 Pond is divided into three sections: the No. 1 settling basin, the No. 2 settling basin, and the main body of the pond. Recycle water enters the pond in the No. 1 settling basin. The water then flows via overflow pipes into the No. 2 settling basin. The water then flows via overflow pipes into the No. 2 settling basin. From the second settling compartment, the water flows via additional overflow pipes into the main body of the pond.

The operating level in both settling compartments is fixed by the height of the overflow pipes. In the No. 1 settling basin this fixed water level is 279.8 feet mean sea level (msl), and in the No. 2 settling basin the fixed water level is 279.5 feet msl. The exterior levee crown

around the two settling basins is 284 feet msl. A minimum freeboard of 2 feet is maintained. It should be noted that the two settling compartments would overtop the interior levees into the main pond before overtopping the exterior levees. Daily inspections as well as multiple overflow pipes from the settling basins to the main pond provide safeguards against flow restriction resulting from plugging of overflow pipes.

Since the pond is only used in special situations and receives rainfall, the water level in the main body of the pond fluctuates. The design, construction, maintenance, and operation of the No. 1 well pond prevent overtopping by overfilling, wave action, or action of storms. The pond level is controlled by pumping water from the main body of the pond for processing in the on-site recycle water recovery unit. The pond level is recorded daily. The levee crown around the main pond is a minimum of 284 feet msl. A minimum freeboard of 2 feet is maintained in the main pond.

Solids in the recycle water are settled in the two settling basins within the pond area. A floating dredge is used to periodically collect the settled solids. The dredged slurry is either returned to the recycle water recovery system for processing through the belt press and sludge dryer or processed on-site by a contractor. Process sludge is containerized and disposed off-site at a permitted facility.

The dredging operation is conducted so that the clay bottom of the No. 1 Pond is not compromised and so the capacity of the No. 1 Pond is maintained. During dredging operations, the dredge auger is placed just below the surface of the sludge. Normally, the dredge is maintained at a stationary position and the sludge flows by gravity to the dredge auger. Occasionally the dredge auger is moved to different locations in the impoundment. When this occurs, the dredge personnel use appropriate methods for determining the depth and thickness of the sludge and the location of the clay bottom. These methods include the use of a probe rod to measure the thickness of the sludge and comparison with the plot plan of the No. 1 Pond (Figure 8) to assess the relative elevation of the clay bottom.

### **5.1 WASTEWATER FLOW**

Recycle water flow is monitored by flowmeters. These flowmeters are used to monitor the flow pumped to the pond from the process area and the flow of recycle water returned to the treatment unit from the No. 1 Pond. The water level of the No. 1 Pond is measured and recorded daily.

### **5.2 GROUNDWATER MONITORING**

UOP has implemented a groundwater monitoring program for the No. 1 Pond. Groundwater monitoring will be conducted as described in Appendix H of the Mandatory Modification Document.

### **5.3 AIR MONITORING**

Due to the nature of the waste handling in the No. 1 Pond, the unit does not produce gas. The pH of the recycle water is maintained below 7.75 to minimize ammonia and trimethylamine emissions. Air monitoring is conducted monthly for ammonia and trimethylamine on the down-wind side of the pond.

There is no potential to produce methane gas in the No. 1 Pond, so that air-monitoring requirements are not applicable. There also are no strong odors at the No. 1 Pond. Per the facility Title V air permits, the pH of the pond is maintained between a pH of 5.0 and 7.75 Standard Units to retain odorous compounds in solution.

### **5.4 GAS MONITORING**

There is no gas-monitoring system at the No. 1 Pond because the waste materials do not generate gas.

### **5.5 INSPECTIONS**

The No. 1 Pond is inspected on a daily basis and after storms. The purpose of these inspections is to ensure that a minimum of 2 feet of freeboard is maintained in the pond and to check the integrity of the impounding levees. The inspections are conducted to detect

evidence of deterioration of the dikes and levees, overtopping of the levees, any malfunctions, or improper operation of the No.1 Pond. Inspection forms are maintained by the UOP Environmental Department.

Since the pond is typically only used in the special situations such as for surge capacity or when the injection wells are not operational, maintaining 2 feet of freeboard is usually not a problem. Freeboard is checked daily and noted on an inspection forms.

The areas surrounding the No.1 Pond and outboard side slopes of the levee are covered with grass to enhance the aesthetics of the facility and to prevent erosion as well as to increase stability of the side slopes. The levees are inspected daily for evidence of erosion, leaks, burrowing animals, and other signs of potential problems with the levees. The grass is maintained by a contract mowing service.

Since the No. 1 Pond is used to manage recycle water, the potential for dust, litter, and odor is minimal.

**6.1 RECORDKEEPING AND REPORTING**

UOP will maintain all routing management and administrative records and documentation necessary for efficient business operation and for preparation of the reports required by the Department of Environmental Quality as outlined in the Solid Waste Rules and Regulations. These records will be maintained throughout the operational life of the facility and shall be kept on file for at least 3 years after closure.

UOP does not accept waste for processing or disposal at the facility and therefore shall not maintain records of transporters for the transporting of waste.

Records maintained pertaining to solid waste include, as appropriate:

- A copy of the Louisiana Solid Waste Rules and Regulations;
- A copy of the permit;
- A copy of the permit application;
- Copies of permit modifications;
- Certified field notes for construction;
- Operator training programs;
- Daily logs of No. 1 Pond water level and pH;
- Quality assurance/quality control records;
- Inspection records;
- Records demonstrating that liners, leachate control systems; and leak-detection and cover systems are constructed or installed in accordance with appropriate quality assurance procedures, as applicable;
- Monitoring, testing, and analytical data;
- Other applicable or required data deemed necessary by the administrative authority;
- Groundwater monitoring results;
- Post-closure monitoring results; as applicable;
- Copies of all documents received from and submitted to the Solid Waste Division of the Louisiana Department of Environmental Quality and other regulatory agencies; and
- Correspondence.

Records are maintained by the UOP Environmental Department or by plant Utilities.

## **6.2 REPORTING REQUIREMENTS**

### **6.2.1 Annual Reporting Requirements**

UOP will continue to submit an annual report to the Solid Waste Division by August 1 of each year. The annual report will cover disposal activities during the previous reporting year. The reporting year is from July 1 through June 30. Annual reports will be submitted until closure of the facility.

Each annual report will contain the following information, as applicable:

- Type and quantity of solid waste received from in-state generators;
- Type and quantity of solid waste received from out-of-state generators;
- Quantities will be expressed in wet-weight tons;
- Industrial waste number of generators from which the facility has received waste;
- Estimated remaining capacity of the facility as of the end of the reporting period; and
- Appropriate supporting calculations.

UOP will obtain the form from the Solid Waste Division for filing the annual report.

### **6.2.2 Groundwater Reports**

UOP will submit to the Solid Waste Division the results of each groundwater monitoring sampling event. Groundwater monitoring reports must be submitted to the Solid Waste Division in accordance with LAC 33:VII.711.E. Groundwater monitoring procedures are described in Appendix H of the UOP Mandatory Modification Document. Groundwater monitoring reports will be submitted on forms provided by the Solid Waste Division, if available. Groundwater monitoring reports must include at a minimum the following information:

- Groundwater monitoring sample results;
- Documentation of the chain of custody of samples for each sampling event;
- A potentiometric surface map for each zone monitored;
- An isopleth map for each well of all parameters or constituents or plots by sample concentration of parameters or constituents versus time; and
- A statement of whether a statistically significant difference in concentration over background concentrations is detected.

During corrective action, semiannual reports will include the following information for the groundwater recover program:

- Recovery well analytical results;
- Observation well analytical results;
- An isoconcentration map for chloride;
- Volume of groundwater recovered;
- Periods of down-time for the recovery wells;
- Changes to the recovery system since the last report; and
- Problems encountered during the period covered by the report.

Analytical results will be presented in a tabular form and chloride concentrations for each well will be plotted.

Annually, in the second semiannual report, the recovery system will be evaluated. The evaluation will include conclusions and recommendations for the recovery program.

UOP estimates that 1 to 3 personnel will be required to operate the facility. The classification of the personnel operating the No. 1 Pond is Roving Utilities. The surface impoundments requires minimal attention; therefore, the personnel responsible for operation of the No. 1 Pond have other job responsibilities as well. These personnel will be responsible for conducting inspection of the levees and other elements of the process and performing or coordinating any required maintenance activities. When the floating dredge is in use, typically two people are required to operate the dredge.

Personnel that work at the No. 1 Pond are trained in the implementation of the Emergency Response Plan (Appendix F of the Mandatory Modification Document). Review of these procedures is conducted annually. An outline of the training is provided in Attachment 2 of this plan. Training in the operation of the No. 1 Pond, including operation of the dredge, is provided through on the job training.

## **8.1 EQUIPMENT**

On a day-to-day basis, no unique or special equipment will be required to operate the facility. If maintenance is required, equipment will be brought in from the maintenance department or local suppliers.

A floating dredge is used to collect settled solids from the bottom of the surface impoundment. The dredge is guided by both an operator and a cable system. The cable system ensures a straight and uniform dredge path. Typically, the operator manning the dredge regulates the cutterhead depth while an additional operator, present on shore, moves the cables and assures the safety of the operator on the dredge. Normally, the dredge remains in a stationary position and the sludge flows by gravity to the dredge auger for removal. When the dredge is moved to a new location in the No. 1 Pond, the dredge personnel set the dredge auger just below the surface of the sludge. The dredge personnel assess the thickness of the sludge with a probe rod and the relative location of the clay bottom by comparison with the plot plan of the No. 1 Pond (Figure 8).

Floating layers of oil occasionally form on the surface of the pond. The oil is vacuumed from the surface and may be pumped to a storage tank located inside the pond levee wall. This oil is sent off-site for recycling.

## **8.2 MAINTENANCE**

This section addresses procedures in case of breakdowns and protocols to ensure that the design and capacity of the pond remain unchanged and ensure the grade and slope of the on-site drainage system and diversion system serve their intended function. Inspection of the levees and freeboard is discussed in Section 5.4 of this Operational Plan.

The primary operational constraint of the No. 1 Pond is the level of the water in the pond. The water level or freeboard is visually checked several times a day and inspected and recorded daily. The pond is operated to maintain at least 2 feet of freeboard. In the event the water level rises to within 2 feet of the top of the levee the plant has two options: temporarily suspend plant operations or temporarily use the borrow pit for storage until the recycle water can be recycled through the process or injected through the deep-well. If UOP decides to use

the borrow pit, UOP will obtain approval from the SWD. UOP will only use the borrow pit in emergency situations.

Other potential problems that might be encountered in the operation of the No. 1 Pond concerns maintaining the integrity of the levee that surrounds the pond. To ensure proper operation of the No. 1 Pond, the levee system is inspected. The levee system is inspected for evidence of erosion, seepage, dead or stressed vegetation, and other problems with the levee system. If any problems are observed procedures are implemented to rectify the problem. Erosion of the levee is remedied by identifying the cause of erosion and rebuilding the area eroded with soil. Seepage through the levee will be corrected in the same manner as levee erosion. Areas of stressed or dead vegetation will be corrected by either reworking the area or fertilizing the vegetation or revegetating the area.

Any excessive vegetative growth that prevents access, inspection, or operation of the No. 1 Pond will be removed.

Operations of the UOP plant and No. 1 Pond are not greatly affected by the inclement weather. The greatest impact would be to the water level in the No. 1 Pond. If freeboard becomes a problem as the result of a storm, it would be managed as described in the first part of this section.

If problems are encountered with the dredge, it will be repaired. UOP may elect to hire a contractor to dredge the pond as appropriate.

Protocols to ensure that the design and capacity of the pond remain unchanged and ensure the grade and slope of the on-site drainage system and diversion system serve their intended function are implemented through inspection of the levees. If problems are observed then they are repaired as described previously in this section. If severe problems are observed with the levee system that may affect the design or capacity of the pond or the integrity of the levee system, then an independent engineering firm or contractor is brought in to evaluate and repair, as necessary, the problems with the pond.

Since the recycle water is a nonhazardous, nonflammable, nonreactive solid waste the potential for emergency situations associated with the operation of the pond are minimal. Emergency personnel and response protocols are presented in the Emergency Response Plan, Appendix F of the Mandatory Modification Document. Potential problems associated only with the No. 1 Pond are presented below. Upon approval of the Mandatory Modification Document, arrangements will be made with local authorities, hospitals, and other potential emergency responders.

The Emergency Response Plan and this Operational Plan will be updated annually, as appropriate.

## **9.1 FIRE**

The type of wastes stored in these impoundments are not ignitable (with the exception of occasional layers of floating oil/water emulsion which are skimmed off and disposed) or explosive and present no threat of unplanned sudden release that would require emergency response. However, UOP has an Emergency Response Plan to deal with any emergency should one arise. A copy of UOP's Emergency Response Plan is included with the Mandatory Modification Document as Appendix F. In the event of an unforeseen emergency involving a fire, existing mobile fire protection equipment is available at the plant.

In the event of an unforeseen emergency involving a fire, existing mobile fire protection equipment is available at the plant. UOP's internal Emergency Response Team is trained to meet the requirements of Section 472 of the Life Safety Code of the National Fire Protection Association (NFPA). If a fire cannot be handled by site personnel, the Caddo Fire District No. 1 station located at 7058 Old Mooringsport Road will be contacted. The Caddo Fire District No. 1 is reached by calling 911.

## **9.2 INJURIES**

The best deterrent to personal injury is job training and safety training. UOP conducts monthly safety meetings of all personnel. The Emergency Response Plan is reviewed annually.

Minor injuries will be treated at the UOP Plant. UOP has a nurse's station that is staffed full time by a registered nurse.

In the event of a major injury, injured personnel will be transported to Willis-Knighton Bossier Health Center in Bossier City, Louisiana. Personnel may be transported by UOP's ambulance or by EMS by calling 911.

### **9.3 SPILLS**

Spills should be cleaned up in a timely manner. Recycle water spills will be containerized and placed in the No. 1 Pond. Spills of other material will be containerized and placed in the UOP drum storage area. Spills of materials other than process recycle water will not be placed in the No. 1 Pond.

### **9.4 INCLEMENT WEATHER**

Operations at the plant continue as usual during most types of inclement weather. Severe weather conditions, such as in hurricanes or other violent storms, may result in the curtailment of plant operations, depending on the location and severity of such weather and the likelihood of direct impact on the plant. Decisions to curtail operations in inclement weather are made by plant management personnel. However, the plant will be manned 24 hours per day.

**ATTACHMENT 1**  
**WASTEWATER AND SLUDGE PROFILE**

## TABLES

TABLE 1

## NO. 1 POND INFLUENT ANALYTICAL SUMMARY

Parameter	April 6, 2006 HP-WW1	April 6, 2006 HP-WW1 DUP	April 20, 2006 HP-WW2	Concentration Range in No. 1 Pond (historical monitoring)
pH (Standard Units)	3.61	3.51	5.55	6 to 9
Chloride mg/l	18,700	19,400	3,370	2 to 20,000
Sodium mg/l	2,660	2,410	2,260	50 to 3,000
Sulfate mg/l	39.6	39.7	39.2	50 to 5,700
Calcium mg/l	46.7	45.4	40.6	50 to 200
Cobalt mg/l	0.020	0.018	< 0.010	< 0.010
Chromium mg/l	0.029	0.023	0.067	-
Molybdenum mg/l	0.24	0.21	0.095	0.2 to 1.2
Nickel mg/l	1.70	1.67	2.34	0.02 to 0.22
Silver	0.035	0.036	0.017	1 to 36
Ammonia mg/l - N (mostly ammonium chloride)	3,630	4,640	209	1,200 to 34,000
Specific Conductance (umhos/cm)	60,700	61,800	12,340	10,000 to 3,000,000
Oil and Grease mg/l	27.9	21.8	13.7	1 to 1,000
Total Dissolved Solids (TDS) mg/l	13,800	8,400	6,990	20,000 to 30,000
Total Suspended Solids (TSS) mg/l	2,400	2,870	1,360	-
Total Organic Carbon (TOC) mg/l	3,150	3,050	235	4,000 to 5,000
Biological Oxygen Demand (BOD) mg/l	> 374	> 374	377 < BOD < 600	500 to 1,000
Chemical Oxygen Demand (COD) mg/l	1,730	1,950	409	5,000 to 7,000

TABLE 2

**SOLID WASTE (SLUDGE) ANALYTICAL RESULTS  
NO. 1 WASTEWATER HOLDING POND  
UOP SHREVEPORT**

Sample Identifier	HP-SW1	HP-SW1 Duplicate	HP-SW2	HP-SW3	HP-SW4	HP-SW5	HP-SW6	HP-SW7	HP-SW8
Sample Collection Date	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006	April 20, 2006
Total Solids (%)	12.1	11.5	11.1	10.0	9.81	10.5	10.3	14.1	11.4
pH (S.U.)	7.16	7.25	7.15	7.26	7.20	7.35	7.26	6.87	7.05
Specific Conductance (umhos/cm)	6,220	6,190	6,740	5,270	6,730	6,490	7,350	9,010	7,260
Total Organic Carbon (mg/kg)	148,000	179,000	174,000	167,000	154,000	144,000	163,000	158,000	142,000
Ammonia (mg/kg-N)	9,890	5,560	7,460	7,010	8,560	13,200	7,580	15,700	8,640
Total Kjeldahl Nitrogen (mg/kg-N)	7,830	7,080	7,670	14,500	13,300	12,000	11,600	10,000	7,630
Total Phenolics (mg/kg)	0.255	0.655	0.255	< 0.25	0.315	0.495	0.395	< 0.25	0.465
Aluminum (mg/kg)	17,100	17,700	14,800	13,900	12,900	13,900	12,300	19,300	17,400
Arsenic (mg/kg)	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60
Barium (mg/kg)	4.15	4.64	3.72	3.09	3.86	3.95	4.85	3.06	2.66
Cadmium (mg/kg)	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium (mg/kg)	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Chromium VI (mg/kg)	< 1.00	2.00	< 1.00	< 1.00	1.50	4.50	< 1.00	< 1.00	< 1.00
Cobalt (mg/kg)	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Copper (mg/kg)	2.58	2.57	1.86	1.78	1.83	1.72	1.45	3.25	1.63
Iron (mg/kg)	178	194	161	154	158	189	145	175	153
Mercury (mg/kg)	0.030	0.014	0.016	0.013	0.021	0.017	0.018	0.032	< 0.0098
Magnesium	29.9	31.0	26.8	24.9	29.5	32.5	31.5	28.2	21.8
Manganese (mg/kg)	8.98	9.63	7.78	7.39	8.09	9.95	9.61	6.72	3.89
Molybdenum (mg/kg)	4.65	5.05	4.50	4.69	6.19	5.65	3.79	3.24	7.89

**TABLE 2 (Continued)**

**SOLID WASTE (SLUDGE) ANALYTICAL RESULTS  
NO. 1 WASTEWATER HOLDING POND  
UOP SHREVEPORT**

Sample Identifier	HP-SW1	HP-SW1 Duplicate	HP-SW2	HP-SW3	HP-SW4	HP-SW5	HP-SW6	HP-SW7	HP-SW8
Nickel (mg/kg)	20.4	22.3	16.9	17.6	13.5	14.6	15.3	26.1	11.9
Lead (mg/kg)	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Selenium (mg/kg)	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60
Silver (mg/kg)	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sodium (mg/kg)	2,200	2,190	2,150	2,370	2,360	2,160	2,350	2,470	2,200
Thallium (mg/kg)	2.70	3.13	2.47	1.93	1.58	1.85	1.59	4.32	1.96
Zinc (mg/kg)	6.29	6.66	7.65	7.52	8.74	8.16	5.39	4.5	3.96
Chloride (mg/kg)	20,400	16,600	17,300	19,600	18,900	17,200	19,400	40.1	22,200
Cyanide, Total (mg/kg)	< 0.100	< 0.100	< 0.100	< 0.100	0.100	< 0.100	< 0.100	< 0.100	< 0.100
Fluoride (mg/kg)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	3.10	< 1.00
Nitrate (mg/kg)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	1.29
Sulfate (mg/kg)	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50

**FIGURE 1**



## ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.

**Report Date** 04/18/2006

**GCAL Report** 206040718



**Deliver To** URS Corporation  
7389 Floridat Blvd  
Suite 300  
Baton Rouge, LA 70806

**Attn** William Beal

**Customer** URS/WCC

**Project** UOP ANALYTICAL PROJECT

## **CASE NARRATIVE**

**Client:** URS/WCC      **Report:** 206040718

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

### **METALS**

In the SW-846 6010B analysis, samples 20604071801 (UOP-HP-WW1) and 20604071802 (UOP-HP-WW1 DUPLICATE) had to be diluted in order to bracket the concentrations within the linear dynamic range of the instrument. This is reflected in the elevated detection limits reported.

In the SW-846 6010B analysis for prep batch 319839, the MS and/or MSD recovery was outside the control limits for Calcium. The LCS recovery was within the control limits. This indicates the analysis is in control and the sample is affected by matrix interference. The MS recovery is not applicable for Calcium because the sample concentration is greater than four times the spike concentration.

### **CONVENTIONALS**

In the BOD analysis for sample 20604071801 (UOP-HP-WW1), four dilutions were set up, and all were depleted of Oxygen. The corresponding greater than result is calculated using a final Dissolved Oxygen of 1.0 on the dilution using the lowest volume of sample.

In the BOD analysis for sample 20604071802 (UOP-HP-WW1 DUPLICATE), four dilutions were set up, and all were depleted of Oxygen. The corresponding greater than result is calculated using a final Dissolved Oxygen of 1.0 on the dilution using the lowest volume of sample.

In the EPA 5310 B (TOC) analysis, samples 20604071801 (UOP-HP-WW1) and 20604071802 (UOP-HP-WW1 DUPLICATE) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the HACH 8000 analysis, samples 20604071801 (UOP-HP-WW1) and 20604071802 (UOP-HP-WW1 DUPLICATE) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the EPA 325.2 Chloride analysis, samples 20604071801 (UOP-HP-WW1) and 20604071802 (UOP-HP-WW1 DUPLICATE) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

The Sample/Duplicate RPD for Total Organic Carbon for analytical batch 319810 is not applicable because the sample and/or duplicate concentration is less than five times the reporting limit.

# Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

## Common Abbreviations Utilized in this Report

<b>ND</b>	Indicates the result was Not Detected at the specified RDL
<b>DO</b>	Indicates the result was Diluted Out
<b>MI</b>	Indicates the result was subject to Matrix Interference
<b>TNTC</b>	Indicates the result was Too Numerous To Count
<b>SUBC</b>	Indicates the analysis was Sub-Contracted
<b>FLD</b>	Indicates the analysis was performed in the Field
<b>PQL</b>	Practical Quantitation Limit
<b>MDL</b>	Method Detection Limit
<b>RDL</b>	Reporting Detection Limit
<b>00:00</b>	Reported as a time equivalent to 12:00 AM

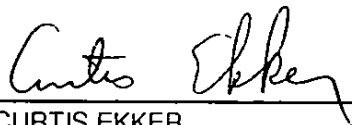
## Reporting Flags Utilized in this Report

<b>J</b>	Indicates an estimated value
<b>U</b>	Indicates the compound was analyzed for but not detected
<b>B</b>	(ORGANICS) Indicates the analyte was detected in the associated Method Blank
<b>B</b>	(INORGANICS) Indicates the result is between the RDL and MDL

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with ISO Guide 25 and NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.



CURTIS EKKER  
DATA VALIDATION MANAGER  
GCAL REPORT 206040718

# Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604071801	UOP-HP-WW1	Water	04/06/2006 14:57	04/07/2006 09:55
20604071802	UOP-HP-WW1 DUPLICATE	Water	04/06/2006 14:57	04/07/2006 09:55

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604071801	UOP-HP-WW1	Water	04/06/2006 14:57	04/07/2006 09:55

### SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/09/2006 16:20	319839	3010A	1	04/11/2006 21:49	CNB	320113
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-70-2	Calcium	46.7	0.10		mg/l	
7440-47-3	Chromium	0.029	0.010		mg/l	
7440-48-4	Cobalt	0.020	0.010		mg/l	
7439-98-7	Molybdenum	0.24	0.050		mg/l	
7440-02-0	Nickel	1.70	0.040		mg/l	
7440-22-4	Silver	0.035	0.010		mg/l	

### SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/09/2006 16:20	319839	3010A	5	04/14/2006 21:36	AJW	320284
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-23-5	Sodium	2660	5.00		mg/L	

### EPA 160.1, TDS

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/09/2006 13:00	LMC2	319830
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-035	Total Dissolved Solids(TDS)	13800	10.0		mg/L	

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 11:00	319697	4500-NH3 BE	1	04/08/2006 08:52	OLT	319764
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	3630	1.0		mg/L-N	

### HACH 8000 - COD

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	04/09/2006 07:00	HLO	319773
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-004	COD	1730	250		mg/L	

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604071801	UOP-HP-WW1	Water	04/06/2006 14:57	04/07/2006 09:55

### EPA 325.2 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200	04/10/2006 10:26	AEL	319859
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16887-00-6	Chloride		18700	200		mg/L

### 5210B BOD (5 Day)

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 14:30	319716	BOD PREP	1	04/07/2006 14:30	CDT	320166
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-002	BOD		>374	2		mg/L

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/09/2006 16:45	LMC2	319853
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-011	Specific Conductance		60700	10		umhos/cm

### EPA 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	04/09/2006 13:36	AEL	319810
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-012	Total Organic Carbon		3150	50.0		mg/L

### EPA 1664A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 17:00	319725	O&G 1664A	1	04/08/2006 14:30	LMC2	319790
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-007	Oil and Grease		27.9	5.0		mg/L

### EPA 375.4 Sulfate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/10/2006 17:29	HLO	319925
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		39.6	5.0		mg/L

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604071801	UOP-HP-WW1	Water	04/06/2006 14:57	04/07/2006 09:55

## 2540 D, TSS - Water

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/07/2006 14:25	RLY	319732
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-009	Total Suspended Solids		2400	1		mg/L

## 4500 H+B / 9040A - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/07/2006 10:40	OLT	319746
CAS#	Parameter		Result	RDL	REG LIMIT	Units
pH	pH		3.61	1.00	12.5	pH unit

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604071802	UOP-HP-WW1 DUPLICATE	Water	04/06/2006 14:57	04/07/2006 09:55

## SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/09/2006 16:20	319839	3010A	1	04/11/2006 21:55	CNB	320113
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-70-2	Calcium	45.4	0.10		mg/L	
7440-47-3	Chromium	0.023	0.010		mg/L	
7440-48-4	Cobalt	0.018	0.010		mg/L	
7439-98-7	Molybdenum	0.21	0.050		mg/L	
7440-02-0	Nickel	1.67	0.040		mg/L	
7440-22-4	Silver	0.036	0.010		mg/L	

## SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/09/2006 16:20	319839	3010A	5	04/14/2006 21:43	AJW	320284
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-23-5	Sodium	2410	5.00		mg/L	

## EPA 160.1, TDS

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/09/2006 13:00	LMC2	319830
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-035	Total Dissolved Solids(TDS)	8400	10.0		mg/L	

## EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 11:00	319697	4500-NH3 BE	1	04/08/2006 08:57	OLT	319764
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	4640	1.0		mg/L-N	

## HACH 8000 - COD

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	04/09/2006 07:01	HLO	319773
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-004	COD	1950	250		mg/L	

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604071802	UOP-HP-WW1 DUPLICATE	Water	04/06/2006 14:57	04/07/2006 09:55

## EPA 325.2 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200	04/10/2006 10:27	AEL	319859
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16887-00-6	Chloride		19400	200		mg/L

## 5210B BOD (5 Day)

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 14:30	319716	BOD PREP	1	04/07/2006 14:30	CDT	320166
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-002	BOD		>374	2		mg/L

## 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/09/2006 16:45	LMC2	319853
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-011	Specific Conductance		61800	10		umhos/cm

## EPA 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	04/09/2006 13:54	AEL	319810
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-012	Total Organic Carbon		3050	50.0		mg/L

## EPA 1664A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/07/2006 17:00	319725	O&G 1664A	1	04/08/2006 14:30	LMC2	319790
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-007	Oil and Grease		21.8	5.0		mg/L

## EPA 375.4 Sulfate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/10/2006 17:31	HLO	319925
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		39.7	5.0		mg/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604071802	UOP-HP-WW1 DUPLICATE	Water	04/06/2006 14:57	04/07/2006 09:55

## 2540 D, TSS - Water

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/07/2006 14:25	RLY	319732
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-009	Total Suspended Solids		2870	1		mg/l

## 4500 H+B / 9040A - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/07/2006 10:40	OLT	319746
CAS#	Parameter		Result	RDL	REG LIMIT	Units
pH	pH		3.51	1.00	12.5	pH unit

# Inorganics Quality Control Summary

Analytical Batch 320113 Prep Batch 319839 Prep Method 3010A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		MB319839 356453 Method Blank 04/09/2006 16:20 04/11/2006 20:43 Water		LCS319839 356454 LCS 04/09/2006 16:20 04/11/2006 20:50 Water	
	<b>SW-846 6010B ICP</b>		Units Result	mg/L RDL	Spike Added	Result % R Limits % R
7439-98-7	Molybdenum		ND	0.050	0.50	0.51 101 80 - 120
7440-02-0	Nickel		ND	0.040	0.50	0.53 107 80 - 120
7440-22-4	Silver		ND	0.010	0.50	0.48 96 80 - 120
7440-23-5	Sodium		ND	1.00	20.0	20.5 103 80 - 120
7440-47-3	Chromium		ND	0.010	0.50	0.50 100 80 - 120
7440-48-4	Cobalt		ND	0.010	0.50	0.50 101 80 - 120
7440-70-2	Calcium		ND	0.10	5.00	5.25 105 80 - 120

Analytical Batch 320113 Prep Batch 319839 Prep Method 3010A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		ECP-3-WEST GW 20604074701 SAMPLE 04/09/2006 16:20 04/11/2006 20:57 Water		356187MS 356456 MS 04/09/2006 16:20 04/11/2006 21:03 Water		356187MSD 356492 MSD 04/09/2006 16:20 04/11/2006 21:09 Water	
	<b>SW-846 6010B ICP</b>		Units Result	mg/L RDL	Spike Added	Result % R Limits % R	Result % R Limits % R	Result % R Limits % R
7439-98-7	Molybdenum		0.0076	0.050	0.50	0.52 103 75 - 125	0.53 104 75 - 125	0.53 104 75 - 125
7440-02-0	Nickel		0.021	0.040	0.50	0.54 105 75 - 125	0.56 107 75 - 125	0.56 107 75 - 125
7440-22-4	Silver		0.0	0.010	0.50	0.51 102 75 - 125	0.52 104 75 - 125	0.52 104 75 - 125
7440-23-5	Sodium		95.3	1.00	20.0	117 111 75 - 125	122 133* 75 - 125	122 133* 75 - 125
7440-47-3	Chromium		0.0153	0.010	0.50	0.53 103 75 - 125	0.55 106 75 - 125	0.55 106 75 - 125
7440-48-4	Cobalt		0.0072	0.010	0.50	0.50 99 75 - 125	0.52 102 75 - 125	0.52 102 75 - 125
7440-70-2	Calcium		211	0.10	5.00	216 94 75 - 125	226 290* 75 - 125	226 290* 75 - 125

# General Chemistry Quality Control Summary

Analytical Batch 319830 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB319830 356426 Method Blank 04/09/2006 13:00 Water	LCS319830 356427 LCS 04/09/2006 13:00 Water	
<b>EPA 160.1, TDS</b>				
WET-035	Total Dissolved Solids(TDS)	Units Result ND	mg/L RDL 10.0	Spike Added 1000
			Result 1030	% R 103
				Control Limits % R 80 - 120

Analytical Batch 319830 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MW #3 20604051903 SAMPLE 04/09/2006 13:00 Water	354937DUP 356428 DUP 04/09/2006 13:00 Water	
<b>EPA 160.1, TDS</b>				
WET-035	Total Dissolved Solids(TDS)	Units Result 98.0	mg/L RDL 10.0	Result 94.0
				RPD Limit 25

# General Chemistry Quality Control Summary

Analytical Batch 319764 Prep Batch 319697 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB319697 355782 Method Blank 04/07/2006 11:00 04/07/2006 15:39 Water	LCS319697 355783 LCS 04/07/2006 11:00 04/07/2006 15:39 Water		
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Spike Added	Result	Control Limits % R
7664-41-7 Ammonia	ND	1.0	15.0	13.5	90 80 - 120

Analytical Batch 319764 Prep Batch 319697 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	OUTFALL 201 20604054501 SAMPLE 04/07/2006 11:00 04/07/2006 15:39 Water	355064MS 355784 MS 04/07/2006 11:00 04/07/2006 15:39 Water		
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Spike Added	Result	Control Limits % R
7664-41-7 Ammonia	0.00	1.0	15.0	13.8	92 74.6 - 125

Analytical Batch 319764 Prep Batch 319697 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	Outfall 001 (COMP) 20604054602 SAMPLE 04/07/2006 11:00 04/07/2006 15:39 Water	355068DUP 355785 DUP 04/07/2006 11:00 04/07/2006 15:39 Water		
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Result	RPD Limit	RPD Limit
7664-41-7 Ammonia	0.00	1.0	0.00	0	25

# General Chemistry Quality Control Summary

Analytical Batch 319773 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix	MB319773 356235 Method Blank 04/09/2006 06:50 Water	LCS319773 356236 LCS 04/09/2006 06:50 Water				
HACH 8000 - COD			Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
C-004 COD			ND	5.0	75.0	74.1	99	80 - 120

Analytical Batch 319773 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix	OUTFALL 001 20604051001 SAMPLE 04/09/2006 06:51 Water	354889MS 356238 MS 04/09/2006 06:51 Water				
HACH 8000 - COD			Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
C-004 COD			2.8	5.0	75.0	72.8	93	75 - 125

Analytical Batch 319773 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix	OUTFALL 001 20604051001 SAMPLE 04/09/2006 06:51 Water	354889DUP 356237 DUP 04/09/2006 06:51 Water			
HACH 8000 - COD			Units Result	mg/L RDL	Result	RPD	RPD Limit
C-004	COD		2.8	5.0	2.8	0	25

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	319859 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB319859 356529 Method Blank 04/10/2006 09:13 Water	LCS319859 356530 LCS 04/10/2006 09:14 Water			
<b>EPA 325.2 Chloride</b>					Units Result	mg/L RDL	Spike Added
16887-00-6	Chloride		ND		60.0	1.0	
					Result	% R	Control Limits % R
					62.9	105	80 - 120

Analytical Batch Prep Batch	319859 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM04-200D 20604052211 SAMPLE 04/10/2006 09:27 Water	CM04-200D MS 20604052217 MS 04/10/2006 09:29 Water			
<b>EPA 325.2 Chloride</b>					Units Result	mg/L RDL	Spike Added
16887-00-6	Chloride		19.4		60.0	1.0	
					Result	% R	Control Limits % R
					83.4	107	75 - 125

Analytical Batch Prep Batch	319859 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM04-200D 20604052211 SAMPLE 04/10/2006 09:27 Water	CM04-200D DUP 20604052219 DUP 04/10/2006 09:28 Water			
<b>EPA 325.2 Chloride</b>					Units Result	mg/L RDL	Spike Added
16887-00-6	Chloride		19.4		1.0		
					Result	RPD Limit	RPD Limit
					19.3	0.5	25

# General Chemistry Quality Control Summary

Analytical Batch 320166 Prep Batch 319716 Prep Method BOD PREP		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	LCS319716 355920 LCS 04/07/2006 14:30 04/07/2006 14:30 Water		
5210B BOD (5 Day)					
C-002	BOD		Spike Added 198	Result 174	% R 88 Control Limits % R 83.5 -115.5

Analytical Batch 320166 Prep Batch 319716 Prep Method BOD PREP		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	209076 OTFL 2001 20604063401 SAMPLE 04/07/2006 14:30 04/07/2006 14:30 Water	209076 OTFL 2001 DUP 20604063402 DUP 04/07/2006 14:30 04/07/2006 14:30 Water	RPD Limit	RPD	25
5210B BOD (5 Day)			Units Result	Result			
C-002 BOD			8	mg/L RDL	2	8	0

# General Chemistry Quality Control Summary

Analytical Batch 319853 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix	UOP-HP-WW1 20604071801 SAMPLE 04/09/2006 16.45 Water	355880DUP 356504 DUP 04/09/2006 16.45 Water			
9050A Specific Conductance			Units Result	umhos/cm RDL	Result	RPD	RPD Limit
C-011	Specific Conductance		60700	10	61300	1	10

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	319810 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB319810 356383 Method Blank 04/09/2006 07:32 Water	LCS319810 356384 LCS 04/09/2006 07:48 Water
<b>EPA 5310B TOC</b>				
C-012	Total Organic Carbon	Units Result	mg/L RDL	Spike Added
		ND	1.0	50.0
		Result	48.2	% R
				96
		Control Limits % R	80 - 120	

Analytical Batch Prep Batch	319810 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MW-50 20604074101 SAMPLE 04/09/2006 12:43 Water	356104MS 356386 MS 04/09/2006 13:19 Water
<b>EPA 5310B TOC</b>				
C-012	Total Organic Carbon	Units Result	mg/L RDL	Spike Added
		7.9	2.0	100
		Result	98.7	% R
				91
		Control Limits % R	75 - 125	

Analytical Batch Prep Batch	319810 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MW-50 20604074101 SAMPLE 04/09/2006 12:43 Water	356104DUP 356385 DUP 04/09/2006 13:00 Water
<b>EPA 5310B TOC</b>				
C-012	Total Organic Carbon	Units Result	mg/L RDL	RPD Limit
		7.9	2.0	5 6
				34*
				25

# General Chemistry Quality Control Summary

Analytical Batch 319790 Prep Batch 319725 Prep Method O&G 1664A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB319725 355966 Method Blank 04/07/2006 17:00 04/08/2006 14:30 Water	LCS319725 355967 LCS 04/07/2006 17:00 04/08/2006 14:30 Water
<b>EPA 1664A</b>	Units Result	mg/L RDL	Spike Added
C-007 Oil and Grease	ND	5.0	40.0
		Result	% R
		33.9	85
			Control Limits % R
			78 - 114

Analytical Batch 319790 Prep Batch 319725 Prep Method O&G 1664A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	320696 EFFL GRAB 20604055302 SAMPLE 04/07/2006 17:00 04/08/2006 14:30 Water	620696 EFFL GRAB (MS) 20604055304 MS 04/07/2006 17:00 04/08/2006 14:30 Water
<b>EPA 1664A</b>	Units Result	mg/L RDL	Spike Added
C-007 Oil and Grease	0.00	5.0	40.0
		Result	% R
		34.6	86
			Control Limits % R
			78 - 114

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	319925 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB319925 356818 Method Blank 04/10/2006 15:05 Water	LCS319925 356819 LCS 04/10/2006 15:06 Water			
<b>EPA 375.4 Sulfate</b>		Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
14808-79-8	Sulfate	ND	5.0	20.0	21.6	108	80 - 120

Analytical Batch Prep Batch	319925 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM04-200D 20604052211 SAMPLE 04/10/2006 16:57 Water	CM04-200D MS 20604052217 MS 04/10/2006 16:58 Water			
<b>EPA 375.4 Sulfate</b>		Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
14808-79-8	Sulfate	1.1	5.0	20.0	22.7	108	75 - 125

Analytical Batch Prep Batch	319925 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM04-200D 20604052211 SAMPLE 04/10/2006 16:57 Water	CM04-200D DUP 20604052219 DUP 04/10/2006 16:58 Water			
<b>EPA 375.4 Sulfate</b>		Units Result	mg/L RDL	Result	RPD	RPD Limit	
14808-79-8	Sulfate	1.1	5.0	1.2	9	25	

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	319732 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB319732 356014 Method Blank 04/07/2006 14:25 Water	LCS319732 356015 LCS 04/07/2006 14:25 Water
<b>2540 D, TSS - Water</b>				
C-009	Total Suspended Solids	Units Result	mg/L RDL	Spike Added
		ND	1	50
				Result
				% R
				Control Limits % R
				43
				86
				80 - 120

Analytical Batch Prep Batch	319732 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	U31EPCW 20604070601 SAMPLE 04/07/2006 14:25 Water	355791DUP 356016 DUP 04/07/2006 14:25 Water
<b>2540 D, TSS - Water</b>				
C-009	Total Suspended Solids	Units Result	mg/L RDL	Result
		7	1	6
				RPD Limit
				15,4
				25

# General Chemistry Quality Control Summary

Analytical Batch 319746 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	POST WATER SAMPLE 20604071701 SAMPLE 04/07/2006 10:30 Water	355875DUP 356110 DUP 04/07/2006 10:30 Water
4500 H+B / 9040A - pH	Units Result	pH unit RDL	RPD Limit
pH	7.48	1.00	0.3
		7.50	6

## CHAIN OF CUSTODY RECORD

Lab use only

Client Name: URS Client # 0463 Workorder # 206040716 Due Date 4-18-06

### Report to:

Client: URS  
Address: 7389 Florida Blvd  
Baton Rouge, LA  
Contact: Willie Beal  
Phone: 225-922-5700  
Fax: 225-922-5701

### Bill to:

Client: SAME  
Address: SAME  
Contact: SAME  
Phone: SAME  
Fax: SAME

P.O. Number

Project Name/Number: #1 Road Sampling / 1922778

Sampled By: Jed Bares

Matrix	Date	Time (2400)	Sample Description	Preservatives	No. Containers
H <sub>2</sub> O	04/06/06	1457	X 100P-HP-6-wal	None	1
				H <sub>2</sub> O <sub>2</sub>	1
				None	1
				H <sub>2</sub> SO <sub>4</sub>	1
				H <sub>2</sub> SO <sub>4</sub>	1
				HCl	1
				None	1
				H <sub>2</sub> SO <sub>4</sub>	1
				H <sub>2</sub> SO <sub>4</sub>	1
				None	1
				H <sub>2</sub> SO <sub>4</sub>	1
				H <sub>2</sub> SO <sub>4</sub>	1
				HCl	1
				None	1
				H <sub>2</sub> SO <sub>4</sub>	1

Turn Around Time: ☐ 24-48 hrs. ☐ 3 days ☐ 1 week ☐ Other

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
<u>Jed Bares</u>	<u>Fed Ex</u>	<u>04/06/06</u>	<u>1700</u>
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
<u>Fed Ex</u>	<u>MLC</u>	<u>4-9-06</u>	<u>955</u>
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.



GULF COAST ANALYTICAL LABORATORIES, INC.  
7979 GSRI Avenue, Baton Rouge, Louisiana 70820-7402  
Phone 225-769-4900 • Fax 225-767-5717

## CHAIN OF CUSTODY RECORD

Lab use only

4125

0463

206040718

4-16-06

Client Name

Workorder #

Due Date

### Report to:

Client: URS

Address: 389 Florida Blvd

Baton Rouge, LA

Contact: Willie Threl

Phone: 225-922-5200

Fax: 225-922-5774

### Bill to:

Client:

Address:

Contact:

Phone:

Fax:

P.O. Number

Project Name/Number

#1 Pond Sampling/19227778

Sampled By:

Joel Bacon

Matrix	Date	Time (2400)	Sample Description	Preservatives	No. Containers
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120	04/06/05	↓	X VOP-HP - final duplicate	None	1
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### Analytical Requests & Method

### Lab use only:

Custody Seal

used ☒ yes ☐ no

in tact ☒ yes ☐ no

Temperature °C

3

Lab ID

Remarks:

72

WHITE: CLIENT FINAL REPORT - CANARY: LABORATORY - PINK: CLIENT

SCAL 06 11 99

Turn Around Time: ☐ 24-48 hrs. ☐ 3 days ☐ 1 week ☒ Standard ☐ Other

Relinquished by: (Signature)

Joel Bacon

Relinquished by: (Signature)

Willie Threl

Relinquished by: (Signature)

Joel Bacon

Received by: (Signature)

Joel Bacon

Received by: (Signature)

Willie Threl

Received by: (Signature)

Joel Bacon

Date: 04/06/06

Time: 1200

Date: 4-9-06

Time: 955

Date: 4-9-06

Time: 955

Note:

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

# PRESERVATION CHECKLIST / COOLER RECEIPT

Gulf Coast Analytical Laboratories, Inc.

WO: 206040718  
 Desc:  
 Work ID: UOP ANALYTICAL PROJECT  
 Project Seq: 41054  
 Client: 0463 - URS/WCC  
 Profile: 62129 - UOP - UOP ANALYTICAL PROJECT

Type: D  
 Report: REVIEW\_RPT  
 Status: WP  
 Created: 4/7/2006 10:31  
 QA:  
 PO:

## WORKORDER SAMPLES

Container ID	Type	Preservative	pH PRESERVATIVE			VOA HEADSPACE			CONTAINER CONDITION
			A	U	N/A	A	U	N/A	
20604071801-1	SC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-3	LC	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-4	LA	H2SO4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-5	4	HCL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-6	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-7	4	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071801-8	OC	HNO3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK

Container ID	Type	Preservative	pH PRESERVATIVE			VOA HEADSPACE			CONTAINER CONDITION
			A	U	N/A	A	U	N/A	
20604071802-1	SC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-3	LC	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-4	LA	H2SO4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-5	4	HCL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-6	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-7	4	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604071802-8	OC	HNO3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK

A = ACCEPTABLE

U = UNACCEPTABLE

N/A = NOT APPLICABLE

COOLER (S) TEMPERATURE

(A) U

LIMIT = 4C + 1 - 2C

MAXIMUM VOLATILE HEADSPACE BUBBLE 6MM

LABEL(S)

VERIFIED

CUSTODIAN

Custody Seal

used ☒ Yes ☐ No

in tact ☒ Yes ☐ No



## ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.

**Report Date** 05/05/2006

**GCAL Report** 206042117



***Deliver To*** URS Corporation  
7389 Floridat Blvd  
Suite 300  
Baton Rouge, LA 70806

***Attn*** William Beal

***Customer*** URS/WCC

***Project*** UOP ANALYTICAL PROJECT

## **CASE NARRATIVE**

**Client:** URS/WCC      **Report:** 206042117

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

### **SEMI-VOLATILES MASS SPECTROMETRY**

In the SW-846 1311/8270C analysis for prep batch 321121, the LCS/LCSD exhibited RPD failures.

### **METALS**

In the SW-846 6010B analysis, sample 20604211713 (UOP-HP-WW2) had to be diluted in order to bracket the concentrations within the linear dynamic range of the instrument. This is reflected in the elevated detection limits reported.

In the SW-846 6010B analysis, the MS recovery is not applicable for Aluminum for prep batch 320983 because the sample concentration is greater than four times the spike concentration.

In the SW-846 6010B analysis, the MS/MSD recoveries and RPD are not applicable for Calcium and Sodium for prep batch 321768 because the sample concentration is greater than four times the spike concentration.

In the SW-846 1311/6010B analysis for prep batch 321140, the LCS recovery was above the upper control limit for Selenium; however, Selenium was not detected above the reporting limit for samples associated with this QC; therefore, the data is reportable.

In the SW-846 7471A analysis the Sample/Duplicate RPD for Mercury for prep batch 320986 is not applicable because the sample and/or duplicate concentration is less than five times the reporting limit.

### **CONVENTIONALS**

In the BOD analysis for sample 20604211713 (UOP-HP-WW2), eight dilutions were set up, and six were depleted of Oxygen. Two dilutions did meet the minimum depletion requirement. The corresponding greater than result is calculated using a final Dissolved Oxygen of 1.0 on the dilution using a sample volume of 10mls. Using the highest of the dilution not meeting the minimum depletion the BOD result is less than 600mg/L.

In the EPA 325.2 Chloride analysis, sample 20604211713 (UOP-HP-WW2) had to be diluted in order to bracket the concentrations within the limits of the calibration curve.

This is reflected in the elevated detection limits reported.

In the EPA 375.4 Sulfate analysis, sample 20604211713 (UOP-HP-WW2) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the HACH 8000 COD analysis, sample 20604211713 (UOP-HP-WW2) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the EPA 5310 B TOC analysis, sample 20604211713 (UOP-HP-WW2) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the EPA 9251 Chloride analysis, samples 20604211701 (UOP-HP-SW1), 20604211702 (UOP-HP-SW1 DUPLICATE), 20604211703 (UOP-HP-SW2), 20604211705 (UOP-HP-SW3), 20604211706 (UOP-HP-SW4), 20604211708 (UOP-HP-SW5), 20604211709 (UOP-HP-SW6) and 20604211711 (UOP-HP-SW8) had to be diluted in order to bracket the concentrations within the limits of the calibration curve. This is reflected in the elevated detection limits reported.

In the EPA 7196A Solid Hex Chromium analysis for analytical batch 321190, the MS recovery was outside the control limits for Chromium VI. The LCS recovery was within control limits. This indicates the analysis is in control and the sample is affected by a matrix interference.

# Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

## Common Abbreviations Utilized in this Report

<b>ND</b>	Indicates the result was Not Detected at the specified RDL
<b>DO</b>	Indicates the result was Diluted Out
<b>MI</b>	Indicates the result was subject to Matrix Interference
<b>TNTC</b>	Indicates the result was Too Numerous To Count
<b>SUBC</b>	Indicates the analysis was Sub-Contracted
<b>FLD</b>	Indicates the analysis was performed in the Field
<b>PQL</b>	Practical Quantitation Limit
<b>MDL</b>	Method Detection Limit
<b>RDL</b>	Reporting Detection Limit
<b>00:00</b>	Reported as a time equivalent to 12:00 AM

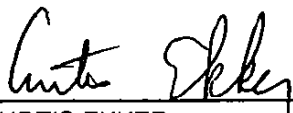
## Reporting Flags Utilized in this Report

<b>J</b>	Indicates an estimated value
<b>U</b>	Indicates the compound was analyzed for but not detected
<b>B</b>	(ORGANICS) Indicates the analyte was detected in the associated Method Blank
<b>B</b>	(INORGANICS) Indicates the result is between the RDL and MDL

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with ISO Guide 25 and NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.



CURTIS EKKER  
DATA VALIDATION MANAGER  
GCAL REPORT 206042117

## Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211701	UOP-HP-SW1	Solid	04/20/2006 07:45	04/21/2006 09:45
20604211702	UOP-HP-SW1 DUPLICATE	Solid	04/20/2006 07:45	04/21/2006 09:45
20604211703	UOP-HP-SW2	Solid	04/20/2006 08:10	04/21/2006 09:45
20604211704	UOP-HP-SW2 TCLP	Solid	04/20/2006 08:10	04/21/2006 09:45
20604211705	UOP-HP-SW3	Solid	04/20/2006 08:45	04/21/2006 09:45
20604211706	UOP-HP-SW4	Solid	04/20/2006 09:05	04/21/2006 09:45
20604211707	UOP-HP-SW4 TCLP	Solid	04/20/2006 09:05	04/21/2006 09:45
20604211708	UOP-HP-SW5	Solid	04/20/2006 09:25	04/21/2006 09:45
20604211709	UOP-HP-SW6	Solid	04/20/2006 09:50	04/21/2006 09:45
20604211710	UOP-HP-SW6 TCLP	Solid	04/20/2006 09:50	04/21/2006 09:45
20604211711	UOP-HP-SW8	Solid	04/20/2006 10:20	04/21/2006 09:45
20604211712	UOP-HP-SW7	Solid	04/20/2006 10:50	04/21/2006 09:45
20604211713	UOP-HP-WW2	Water	04/20/2006 12:24	04/21/2006 09:45

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211701	UOP-HP-SW1	Solid	04/20/2006 07:45	04/21/2006 09:45

## Soil-Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:17	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.030	0.010		mg/kg

## SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/25/2006 23:57	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7429-90-5	Aluminum	17100	8.00		mg/kg	
7440-38-2	Arsenic	ND	1.60		mg/kg	
7440-39-3	Barium	4.15	0.40		mg/kg	
7440-43-9	Cadmium	ND	0.20		mg/kg	
7440-47-3	Chromium	ND	0.40		mg/kg	
7440-48-4	Cobalt	ND	0.40		mg/kg	
7440-50-8	Copper	2.58	0.40		mg/kg	
7439-89-6	Iron	178	4.00		mg/kg	
7439-92-1	Lead	ND	0.60		mg/kg	
7439-95-4	Magnesium	29.9	4.00		mg/kg	
7439-96-5	Manganese	8.98	0.60		mg/kg	
7439-98-7	Molybdenum	4.65	1.20		mg/kg	
7440-02-0	Nickel	20.4	1.60		mg/kg	
7782-49-2	Selenium	ND	1.60		mg/kg	
7440-22-4	Silver	ND	0.40		mg/kg	
7440-28-0	Thallium	2.70	0.55		mg/kg	
7440-66-6	Zinc	6.29	0.80		mg/kg	

## SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 18:20	CNB	321332

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7440-23-5	Sodium	2200	40.0		mg/kg

## EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:23	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211701	UOP-HP-SW1	Solid	04/20/2006 07:45	04/21/2006 09:45

## 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		12.1	0.010		%

## EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter		Result	RDL	REG LIMIT	Units
7664-41-7	Ammonia		9890	200		mg/kg-N

## TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/08/2006 10:00	322478	4500-NH3 BE	1	05/08/2006 14:16	OLT	322484
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-021	Total Kjeldahl Nitrogen		7830	200		mg/kg-N

## 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter		Result	RDL	REG LIMIT	Units
pH	pH		7.16	1.00		pH unit

## 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	50	05/02/2006 10:20	JEM	321853
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16887-00-6	Chloride		20400	500		mg/kg

## 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-011	Specific Conductance		6220	100		umhos/cm

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211701	UOP-HP-SW1	Solid	04/20/2006 07:45	04/21/2006 09:45

## SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-012	Total Organic Carbon		148000	200		mg/kg

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	05/03/2006 16:34	AEL	321498
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16984-48-8	Fluoride		ND	1.00		mg/kg

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:31	JEM	321190
CAS#	Parameter		Result	RDL	REG LIMIT	Units
18540-29-9	Chromium VI		ND	1.00		mg/kg

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:48	JEM	321073
CAS#	Parameter		Result	RDL	REG LIMIT	Units
57-12-5	Cyanide, Total		ND	0.1000		mg/kg

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 14:31	JEM	321937
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		ND	50.0		mg/kg

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:18	AEL	321203
CAS#	Parameter		Result	RDL	REG LIMIT	Units
WET-040	Total Phenolics		0.2550	0.2500		mg/kg

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211702	UOP-HP-SW1 DUPLICATE	Solid	04/20/2006 07:45	04/21/2006 09:45

## Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:29	AJW	321098
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7439-97-6	Mercury	0.014	0.010			mg/kg

## SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 00:56	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7429-90-5	Aluminum	17700	8.00			mg/kg
7440-38-2	Arsenic	ND	1.60			mg/kg
7440-39-3	Barium	4.64	0.40			mg/kg
7440-43-9	Cadmium	ND	0.20			mg/kg
7440-47-3	Chromium	ND	0.40			mg/kg
7440-48-4	Cobalt	ND	0.40			mg/kg
7440-50-8	Copper	2.57	0.40			mg/kg
7439-89-6	Iron	194	4.00			mg/kg
7439-92-1	Lead	ND	0.60			mg/kg
7439-95-4	Magnesium	31.0	4.00			mg/kg
7439-96-5	Manganese	9.63	0.60			mg/kg
7439-98-7	Molybdenum	5.05	1.20			mg/kg
7440-02-0	Nickel	22.3	1.60			mg/kg
7782-49-2	Selenium	ND	1.60			mg/kg
7440-22-4	Silver	ND	0.40			mg/kg
7440-23-5	Sodium	2190	40.0			mg/kg
7440-28-0	Thallium	3.13	0.55			mg/kg
7440-66-6	Zinc	6.66	0.80			mg/kg

## EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:24	AEL	321264
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14797-55-8	Nitrate	ND	0.100			mg/kg-N

## 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-008	Total Solids	11.5	0.010			%

GCAL ID:	Client ID:	Matrix:	Collect Date/Time:	Receive Date/Time:
20604211702	UOP-HP-SW1 DUPLICATE	Solid	04/20/2006 07:45	04/21/2006 09:45

#### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	5560	200			mg/kg-N

#### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/08/2006 10:00	322478	4500-NH3 BE	1	05/08/2006 14:16	OLT	322484
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	7080	200			mg/kg-N

#### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.25	1.00			pH unit

#### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 10:23	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	16600	200			mg/kg

#### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	6190	100			umhos/cm

#### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	179000	200			mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211702	UOP-HP-SW1 DUPLICATE	Solid	04/20/2006 07:45	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 16:33	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00		mg/kg	

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:32	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	2.00	1.00		mg/kg	

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:49	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	ND	0.1000		mg/kg	

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 14:40	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0		mg/kg	

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:19	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	0.6550	0.2500		mg/kg	

RESULTS REPORTED ON A WET WEIGHT BASIS

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211703	UOP-HP-SW2	Solid	04/20/2006 08:10	04/21/2006 09:45

### Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:33	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.016	0.0098		mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:02	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7429-90-5	Aluminum	14800	8.00		mg/kg	
7440-38-2	Arsenic	ND	1.60		mg/kg	
7440-39-3	Barium	3.72	0.40		mg/kg	
7440-43-9	Cadmium	ND	0.20		mg/kg	
7440-47-3	Chromium	ND	0.40		mg/kg	
7440-48-4	Cobalt	ND	0.40		mg/kg	
7440-50-8	Copper	1.86	0.40		mg/kg	
7439-89-6	Iron	161	4.00		mg/kg	
7439-92-1	Lead	ND	0.60		mg/kg	
7439-95-4	Magnesium	26.8	4.00		mg/kg	
7439-96-5	Manganese	7.78	0.60		mg/kg	
7439-98-7	Molybdenum	4.50	1.20		mg/kg	
7440-02-0	Nickel	16.9	1.60		mg/kg	
7782-49-2	Selenium	ND	1.60		mg/kg	
7440-22-4	Silver	ND	0.40		mg/kg	
7440-23-5	Sodium	2150	40.0		mg/kg	
7440-28-0	Thallium	2.47	0.55		mg/kg	
7440-66-6	Zinc	7.65	0.80		mg/kg	

### EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:25	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

### 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		11.1	0.010		%

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211703	UOP-HP-SW2	Solid	04/20/2006 08:10	04/21/2006 09:45

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	7460	200			mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	7670	200			mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.15	1.00			pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 10:24	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	17300	200			mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	6740	100			umhos/cm

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	174000	200			mg/kg

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211703	UOP-HP-SW2	Solid	04/20/2006 08:10	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 16:51	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00		mg/kg	

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:33	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	ND	1.00		mg/kg	

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:50	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	ND	0.1000		mg/kg	

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 14:41	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0		mg/kg	

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:20	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	0.2550	0.2500		mg/kg	

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211704	UOP-HP-SW2 TCLP	Solid	04/20/2006 08:10	04/21/2006 09:45

## SW-846 8270C, TCLP Semi-Voa

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 15:00	321121	3510C	1	04/25/2006 17:41	MJJ	321268

CAS#	Parameter	Result	RDL	REG LIMIT	Units
106-46-7	1,4-Dichlorobenzene	ND	0.0500	7.50	mg/L
95-95-4	2,4,5-Trichlorophenol	ND	0.0500	400	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.0500	2.00	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.0500	0.1300	mg/L
1319-77-3	Cresols	ND	0.1000	200	mg/L
118-74-1	Hexachlorobenzene	ND	0.0500	0.1300	mg/L
87-68-3	Hexachlorobutadiene	ND	0.0500	0.5000	mg/L
67-72-1	Hexachloroethane	ND	0.0500	3.00	mg/L
98-95-3	Nitrobenzene	ND	0.0500	2.00	mg/L
87-86-5	Pentachlorophenol	ND	0.1000	100	mg/L
110-86-1	Pyridine	ND	0.0500	5.00	mg/L
1319-77-3MP	m,p-Cresol	ND	0.0500	200	mg/L
95-48-7	o-Cresol	ND	0.0500	200	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	204	ug/L	82	43 - 110
321-60-8	2-Fluorobiphenyl	250	179	ug/L	72	16 - 128
1718-51-0	Terphenyl-d14	250	210	ug/L	84	47 - 121
4165-62-2	Phenol-d5	500	111	ug/L	22	10 - 76
367-12-4	2-Fluorophenol	500	180	ug/L	36	24 - 96
118-79-6	2,4,6-Tribromophenol	500	444	ug/L	89	19 - 133

## SW-846 6010B, TCLP Metals

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321140	3010A	1	04/25/2006 09:59	AJW	321205

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7440-38-2	Arsenic	ND	0.20	5.00	mg/L
7440-39-3	Barium	ND	1.00	100	mg/L
7440-43-9	Cadmium	ND	0.010	1.00	mg/L
7440-47-3	Chromium	ND	0.050	5.00	mg/L
7439-92-1	Lead	ND	0.10	5.00	mg/L
7782-49-2	Selenium	ND	0.10	1.00	mg/L
7440-22-4	Silver	ND	0.050	5.00	mg/L

## SW-846 7470A, TCLP Mercury

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321141	SW-846 7470A	1	04/25/2006 16:00	AJW	321201

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	ND	0.00020	0.20000	mg/L

RESULTS REPORTED ON A WET WEIGHT BASIS

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211705	UOP-HP-SW3	Solid	04/20/2006 08:45	04/21/2006 09:45

### Soil-Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 10:35	AJW	321098
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7439-97-6	Mercury	0.013	0.0098			mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:08	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7429-90-5	Aluminum	13900	8.00			mg/kg
7440-38-2	Arsenic	ND	1.60			mg/kg
7440-39-3	Barium	3.09	0.40			mg/kg
7440-43-9	Cadmium	ND	0.20			mg/kg
7440-47-3	Chromium	ND	0.40			mg/kg
7440-48-4	Cobalt	ND	0.40			mg/kg
7440-50-8	Copper	1.78	0.40			mg/kg
7439-89-6	Iron	154	4.00			mg/kg
7439-92-1	Lead	ND	0.60			mg/kg
7439-95-4	Magnesium	24.9	4.00			mg/kg
7439-96-5	Manganese	7.39	0.60			mg/kg
7439-98-7	Molybdenum	4.69	1.20			mg/kg
7440-02-0	Nickel	17.6	1.60			mg/kg
7782-49-2	Selenium	ND	1.60			mg/kg
7440-22-4	Silver	ND	0.40			mg/kg
7440-23-5	Sodium	2370	40.0			mg/kg
7440-28-0	Thallium	1.93	0.55			mg/kg
7440-66-6	Zinc	7.52	0.80			mg/kg

### EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:27	AEL	321264
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14797-55-8	Nitrate	ND	0.100			mg/kg-N

### 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-008	Total Solids	10.0	0.010			%

GCAL ID:	Client ID:	Matrix:	Collect Date/Time	Receive Date/Time
20604211705	UOP-HP-SW3	Solid	04/20/2006 08:45	04/21/2006 09:45

#### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	7010	200			mg/kg-N

#### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	14500	200			mg/kg-N

#### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.26	1.00			pH unit

#### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 10:25	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	19600	200			mg/kg

#### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	5270	100			umhos/cm

#### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	167000	200			mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211705	UOP-HP-SW3	Solid	04/20/2006 08:45	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 17:09	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00		mg/kg	

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:34	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	ND	1.00		mg/kg	

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:51	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	ND	0.1000		mg/kg	

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 14:41	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0		mg/kg	

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:21	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	ND	0.2500		mg/kg	

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211706	UOP-HP-SW4	Solid	04/20/2006 09:05	04/21/2006 09:45

### Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:37	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.021	0.0098		mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:15	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7429-90-5	Aluminum	12900	8.00		mg/kg	
7440-38-2	Arsenic	ND	1.60		mg/kg	
7440-39-3	Barium	3.86	0.40		mg/kg	
7440-43-9	Cadmium	ND	0.20		mg/kg	
7440-47-3	Chromium	ND	0.40		mg/kg	
7440-48-4	Cobalt	ND	0.40		mg/kg	
7440-50-8	Copper	1.83	0.40		mg/kg	
7439-89-6	Iron	158	4.00		mg/kg	
7439-92-1	Lead	ND	0.60		mg/kg	
7439-95-4	Magnesium	29.5	4.00		mg/kg	
7439-96-5	Manganese	8.09	0.60		mg/kg	
7439-98-7	Molybdenum	6.19	1.20		mg/kg	
7440-02-0	Nickel	13.5	1.60		mg/kg	
7782-49-2	Selenium	ND	1.60		mg/kg	
7440-22-4	Silver	ND	0.40		mg/kg	
7440-23-5	Sodium	2360	40.0		mg/kg	
7440-28-0	Thallium	1.58	0.55		mg/kg	
7440-66-6	Zinc	8.74	0.80		mg/kg	

### EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:28	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

### 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		9.81	0.010		%

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211706	UOP-HP-SW4	Solid	04/20/2006 09:05	04/21/2006 09:45

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	8560	200			mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	13300	200			mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.20	1.00			pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 09:57	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	18900	200			mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	6730	100			umhos/cm

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	154000	200			mg/kg

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211706	UOP-HP-SW4	Solid	04/20/2006 09:05	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 17:26	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00		mg/kg	

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:35	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	1.50	1.00		mg/kg	

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:54	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	0.1000	0.1000		mg/kg	

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 14:42	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0		mg/kg	

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:22	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	0.3150	0.2500		mg/kg	

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211707	UOP-HP-SW4 TCLP	Solid	04/20/2006 09:05	04/21/2006 09:45

# SW-846 8270C, TCLP Semi-Voa

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 15:00	321121	3510C	1	04/25/2006 17:55	MJJ	321268

CAS#	Parameter	Result	RDL	REG LIMIT	Units
106-46-7	1,4-Dichlorobenzene	ND	0.0500	7.50	mg/L
95-95-4	2,4,5-Trichlorophenol	ND	0.0500	400	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.0500	2.00	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.0500	0.1300	mg/L
1319-77-3	Cresols	ND	0.1000	200	mg/L
118-74-1	Hexachlorobenzene	ND	0.0500	0.1300	mg/L
87-68-3	Hexachlorobutadiene	ND	0.0500	0.5000	mg/L
67-72-1	Hexachloroethane	ND	0.0500	3.00	mg/L
98-95-3	Nitrobenzene	ND	0.0500	2.00	mg/L
87-86-5	Pentachlorophenol	ND	0.1000	100	mg/L
110-86-1	Pyridine	ND	0.0500	5.00	mg/L
1319-77-3MP	m,p-Cresol	ND	0.0500	200	mg/L
95-48-7	o-Cresol	ND	0.0500	200	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	208	ug/L	83	43 - 110
321-60-8	2-Fluorobiphenyl	250	190	ug/L	76	16 - 128
1718-51-0	Terphenyl-d14	250	223	ug/L	89	47 - 121
4165-62-2	Phenol-d5	500	131	ug/L	26	10 - 76
367-12-4	2-Fluorophenol	500	207	ug/L	41	24 - 96
118-79-6	2,4,6-Tribromophenol	500	427	ug/L	85	19 - 133

# SW-846 6010B, TCLP Metals

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321140	3010A	1	04/25/2006 10:06	AJW	321205

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7440-38-2	Arsenic	ND	0.20	5.00	mg/L
7440-39-3	Barium	ND	1.00	100	mg/L
7440-43-9	Cadmium	ND	0.010	1.00	mg/L
7440-47-3	Chromium	ND	0.050	5.00	mg/L
7439-92-1	Lead	ND	0.10	5.00	mg/L
7782-49-2	Selenium	ND	0.10	1.00	mg/L
7440-22-4	Silver	ND	0.050	5.00	mg/L

# SW-846 7470A, TCLP Mercury

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321141	SW-846 7470A	1	04/25/2006 16:02	AJW	321201

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	ND	0.00020	0.20000	mg/L

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211708	UOP-HP-SW5	Solid	04/20/2006 09:25	04/21/2006 09:45

### Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:38	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.017	0.010		mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:21	AJW	321213

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7429-90-5	Aluminum	13900	8.00		mg/kg
7440-38-2	Arsenic	ND	1.60		mg/kg
7440-39-3	Barium	3.95	0.40		mg/kg
7440-43-9	Cadmium	ND	0.20		mg/kg
7440-47-3	Chromium	ND	0.40		mg/kg
7440-48-4	Cobalt	ND	0.40		mg/kg
7440-50-8	Copper	1.72	0.40		mg/kg
7439-89-6	Iron	189	4.00		mg/kg
7439-92-1	Lead	ND	0.60		mg/kg
7439-95-4	Magnesium	32.5	4.00		mg/kg
7439-96-5	Manganese	9.95	0.60		mg/kg
7439-98-7	Molybdenum	5.65	1.20		mg/kg
7440-02-0	Nickel	14.6	1.60		mg/kg
7782-49-2	Selenium	ND	1.60		mg/kg
7440-22-4	Silver	ND	0.40		mg/kg
7440-23-5	Sodium	2160	40.0		mg/kg
7440-28-0	Thallium	1.85	0.55		mg/kg
7440-66-6	Zinc	8.16	0.80		mg/kg

### EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:29	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

### 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		10.5	0.010		%

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211708	UOP-HP-SW5	Solid	04/20/2006 09:25	04/21/2006 09:45

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	13200	200			mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	12000	200			mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.35	1.00			pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 09:58	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	17200	200			mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	6490	100			umhos/cm

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	144000	200			mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211708	UOP-HP-SW5	Solid	04/20/2006 09:25	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 17:44	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00			mg/kg

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:36	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	4.50	1.00			mg/kg

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:55	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	ND	0.1000			mg/kg

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 15:07	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0			mg/kg

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:23	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	0.4950	0.2500			mg/kg

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211709	UOP-HP-SW6	Solid	04/20/2006 09:50	04/21/2006 09:45

## Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 10:46	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.018	0.010		mg/kg

## SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:28	AJW	321213

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7429-90-5	Aluminum	12300	8.00		mg/kg
7440-38-2	Arsenic	ND	1.60		mg/kg
7440-39-3	Barium	4.85	0.40		mg/kg
7440-43-9	Cadmium	ND	0.20		mg/kg
7440-47-3	Chromium	ND	0.40		mg/kg
7440-48-4	Cobalt	ND	0.40		mg/kg
7440-50-8	Copper	1.45	0.40		mg/kg
7439-89-6	Iron	145	4.00		mg/kg
7439-92-1	Lead	ND	0.60		mg/kg
7439-95-4	Magnesium	31.5	4.00		mg/kg
7439-96-5	Manganese	9.61	0.60		mg/kg
7439-98-7	Molybdenum	3.79	1.20		mg/kg
7440-02-0	Nickel	15.3	1.60		mg/kg
7782-49-2	Selenium	ND	1.60		mg/kg
7440-22-4	Silver	ND	0.40		mg/kg
7440-23-5	Sodium	2350	40.0		mg/kg
7440-28-0	Thallium	1.59	0.55		mg/kg
7440-66-6	Zinc	5.39	0.80		mg/kg

## EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:30	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

## 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-008	Total Solids	10.3	0.010		%	

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211709	UOP-HP-SW6	Solid	04/20/2006 09:50	04/21/2006 09:45

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	7580	200			mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	11600	200			mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.26	1.00			pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	20	05/02/2006 09:59	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	19400	200			mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	7350	100			umhos/cm

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	163000	200			mg/kg

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211709	UOP:HP-SW6	Solid	04/20/2006 09:50	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 18:37	JEM	321498
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16984-48-8	Fluoride	ND	1.00			mg/kg

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:37	JEM	321190
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
18540-29-9	Chromium VI	ND	1.00			mg/kg

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:56	JEM	321073
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
57-12-5	Cyanide, Total	ND	0.1000			mg/kg

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 15:09	JEM	321937
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
14808-79-8	Sulfate	ND	50.0			mg/kg

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:26	AEL	321203
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-040	Total Phenolics	0.3950	0.2500			mg/kg

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211710	UOP-HP-SW6 TCLP	Solid	04/20/2006 09:50	04/21/2006 09:45

### SW-846 8270C, TCLP Semi-Voa

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 15:00	321121	3510C	1	04/25/2006 18:10	MJJ	321268

CAS#	Parameter	Result	RDL	REG LIMIT	Units
106-46-7	1,4-Dichlorobenzene	ND	0.0500	7.50	mg/L
95-95-4	2,4,5-Trichlorophenol	ND	0.0500	400	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.0500	2.00	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.0500	0.1300	mg/L
1319-77-3	Cresols	ND	0.1000	200	mg/L
118-74-1	Hexachlorobenzene	ND	0.0500	0.1300	mg/L
87-68-3	Hexachlorobutadiene	ND	0.0500	0.5000	mg/L
67-72-1	Hexachloroethane	ND	0.0500	3.00	mg/L
98-95-3	Nitrobenzene	ND	0.0500	2.00	mg/L
87-86-5	Pentachlorophenol	ND	0.1000	100	mg/L
110-86-1	Pyridine	ND	0.0500	5.00	mg/L
1319-77-3MP	m,p-Cresol	ND	0.0500	200	mg/L
95-48-7	o-Cresol	ND	0.0500	200	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	198	ug/L	79	43 - 110
321-60-8	2-Fluorobiphenyl	250	178	ug/L	71	16 - 128
1718-51-0	Terphenyl-d14	250	224	ug/L	90	47 - 121
4165-62-2	Phenol-d5	500	128	ug/L	26	10 - 76
367-12-4	2-Fluorophenol	500	198	ug/L	40	24 - 96
118-79-6	2,4,6-Tribromophenol	500	438	ug/L	88	19 - 133

### SW-846 6010B, TCLP Metals

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321140	3010A	1	04/25/2006 10:12	AJW	321205

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7440-38-2	Arsenic	ND	0.20	5.00	mg/L
7440-39-3	Barium	1.02	1.00	100	mg/L
7440-43-9	Cadmium	ND	0.010	1.00	mg/L
7440-47-3	Chromium	ND	0.050	5.00	mg/L
7439-92-1	Lead	ND	0.10	5.00	mg/L
7782-49-2	Selenium	ND	0.10	1.00	mg/L
7440-22-4	Silver	ND	0.050	5.00	mg/L

### SW-846 7470A, TCLP Mercury

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 14:00	321141	SW-846 7470A	1	04/25/2006 16:03	AJW	321201

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	ND	0.00020	0.20000	mg/L

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211711	UOP-HP-SW8	Solid	04/20/2006 10:20	04/21/2006 09:45

## Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 10:39	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Unit:
7439-97-6	Mercury	ND	0.0098		mg/kg

## SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:34	AJW	321213
CAS#	Parameter	Result	RDL	REG LIMIT	Unit:	
7429-90-5	Aluminum	17400	8.00		mg/kg	
7440-38-2	Arsenic	ND	1.60		mg/kg	
7440-39-3	Barium	2.66	0.40		mg/kg	
7440-43-9	Cadmium	ND	0.20		mg/kg	
7440-47-3	Chromium	ND	0.40		mg/kg	
7440-48-4	Cobalt	ND	0.40		mg/kg	
7440-50-8	Copper	1.63	0.40		mg/kg	
7439-89-6	Iron	153	4.00		mg/kg	
7439-92-1	Lead	ND	0.60		mg/kg	
7439-95-4	Magnesium	21.8	4.00		mg/kg	
7439-96-5	Manganese	3.89	0.60		mg/kg	
7439-98-7	Molybdenum	7.89	1.20		mg/kg	
7440-02-0	Nickel	11.9	1.60		mg/kg	
7782-49-2	Selenium	ND	1.60		mg/kg	
7440-22-4	Silver	ND	0.40		mg/kg	
7440-23-5	Sodium	2200	40.0		mg/kg	
7440-28-0	Thallium	1.96	0.55		mg/kg	
7440-66-6	Zinc	3.96	0.80		mg/kg	

## EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:32	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	1.29	0.100		mg/kg-N

## 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18.25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		11.4	0.010		%

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211711	UOP-HP-SW8	Solid	04/20/2006 10:20	04/21/2006 09:45

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	8640	200			mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-021	Total Kjeldahl Nitrogen	7630	200			mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
pH	pH	7.05	1.00			pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	50	05/02/2006 10:33	JEM	321853
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
16887-00-6	Chloride	22200	500			mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-011	Specific Conductance	7260	100			umhos/cm

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-012	Total Organic Carbon	142000	200			mg/kg

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211711	UOP-HP-SW8	Solid	04/20/2006 10:20	04/21/2006 09:45

## SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 18:54	JEM	321498
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16984-48-8	Fluoride		ND	1.00		mg/kg

## 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:39	JEM	321190
CAS#	Parameter		Result	RDL	REG LIMIT	Units
18540-29-9	Chromium VI		ND	1.00		mg/kg

## 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:57	JEM	321073
CAS#	Parameter		Result	RDL	REG LIMIT	Units
57-12-5	Cyanide, Total		ND	0.1000		mg/kg

## Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 15:10	JEM	321937
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		ND	50.0		mg/kg

## 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:30	AEL	321203
CAS#	Parameter		Result	RDL	REG LIMIT	Units
WET-040	Total Phenolics		0.4650	0.2500		mg/kg

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
206042117.12	UOP-HP-SW7	Solid	04/20/2006 10:50	04/21/2006 09:45

### Soil Mercury 7471A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320986	SW-846 7471A	1	04/25/2006 09:43	AJW	321098

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7439-97-6	Mercury	0.032	0.010		mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 01:53	AJW	321213

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7429-90-5	Aluminum	19300	8.00		mg/kg
7440-38-2	Arsenic	ND	1.60		mg/kg
7440-39-3	Barium	3.06	0.40		mg/kg
7440-43-9	Cadmium	ND	0.20		mg/kg
7440-47-3	Chromium	ND	0.40		mg/kg
7440-48-4	Cobalt	ND	0.40		mg/kg
7440-50-8	Copper	3.25	0.40		mg/kg
7439-89-6	Iron	175	4.00		mg/kg
7439-92-1	Lead	ND	0.60		mg/kg
7439-95-4	Magnesium	28.2	4.00		mg/kg
7439-96-5	Manganese	6.72	0.60		mg/kg
7439-98-7	Molybdenum	3.24	1.20		mg/kg
7440-02-0	Nickel	26.1	1.60		mg/kg
7782-49-2	Selenium	ND	1.60		mg/kg
7440-22-4	Silver	ND	0.40		mg/kg
7440-28-0	Thallium	4.32	0.55		mg/kg
7440-66-6	Zinc	4.50	0.80		mg/kg

### SW-846 6010B - Solid - ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 14:20	320983	3050B	1	04/26/2006 18:48	CNB	321332

CAS#	Parameter	Result	RDL	REG LIMIT	Units
7440-23-5	Sodium	2470	40.0		mg/kg

### EPA 353.2 Nitrate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321263	EPA 353.2	1	04/25/2006 17:33	AEL	321264

CAS#	Parameter	Result	RDL	REG LIMIT	Units
14797-55-8	Nitrate	ND	0.100		mg/kg-N

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211712	UOP-HP-SW7	Solid	04/20/2006 10:50	04/21/2006 09:45

### 2540 G Total Solids - Solid

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 18:25	RLY	320966
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-008	Total Solids		14.1	0.010		%

### EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 09:00	320924	4500-NH3 BE	1	04/22/2006 11:30	OLT	321020
CAS#	Parameter		Result	RDL	REG LIMIT	Units
7664-41-7	Ammonia		15700	200		mg/kg-N

### TKN 4500 NH3-BE

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 07:30	320923	4500-NH3 BE	1	04/23/2006 13:14	OLT	321126
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-021	Total Kjeldahl Nitrogen		10000	200		mg/kg-N

### 9045C Solid - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 17:00	OLT	320980
CAS#	Parameter		Result	RDL	REG LIMIT	Units
pH	pH		6.87	1.00		pH unit

### 9251 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321852	EPA 9251	1	05/02/2006 09:47	JEM	321853
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16887-00-6	Chloride		40.1	10.0		mg/kg

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/03/2006 10:30	321981	9050A	1	05/03/2006 10:30	LMC2	322002
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-011	Specific Conductance		9010	100		umhos/cm

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211712	UOP-HP-SW7	Solid	04/20/2006 10:50	04/21/2006 09:45

### SW-846 9060M TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/04/2006 10:00	AEL	322179
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-012	Total Organic Carbon		158000	200		mg/kg

### SW-846 9056

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 17:15	321496	5050	1	04/27/2006 19:12	JEM	321498
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16984-48-8	Fluoride		3.10	1.00		mg/kg

### 7196A Solid Hex Chromium

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/24/2006 10:00	320922	3060A	1	04/25/2006 08:41	JEM	321190
CAS#	Parameter		Result	RDL	REG LIMIT	Units
18540-29-9	Chromium VI		ND	1.00		mg/kg

### 9012A Cyanide

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/22/2006 08:00	320921	9012A	1	04/23/2006 14:58	JEM	321073
CAS#	Parameter		Result	RDL	REG LIMIT	Units
57-12-5	Cyanide, Total		ND	0.1000		mg/kg

### Sulfate 9038

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/28/2006 12:05	321882	9038	1	05/02/2006 15:12	JEM	321937
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		ND	50.0		mg/kg

### 9066 - Total Phenolics

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 08:00	320925	9066	1	04/25/2006 10:31	AEL	321203
CAS#	Parameter		Result	RDL	REG LIMIT	Units
WET-040	Total Phenolics		ND	0.2500		mg/kg

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
20604211713	UOP-HP-WW2	Water	04/20/2006 12:24	04/21/2006 09:45

## SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/01/2006 11:45	321768	3010A	1	05/03/2006 00:46	AJW	321875
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-70-2	Calcium	40.6	0.10		mg/L	
7440-47-3	Chromium	0.067	0.010		mg/L	
7440-48-4	Cobalt	ND	0.010		mg/L	
7439-98-7	Molybdenum	0.095	0.050		mg/L	
7440-02-0	Nickel	2.34	0.040		mg/L	
7440-22-4	Silver	0.017	0.010		mg/L	

## SW-846 6010B ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
05/01/2006 11:45	321768	3010A	5	05/03/2006 17:18	AJW	322011
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7440-23-5	Sodium	2260	5.00		mg/L	

## EPA 160.1, TDS

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/23/2006 10:20	RLY	321053
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
WET-035	Total Dissolved Solids(TDS)	6990	10.0		mg/L	

## EPA 4500-NH3 BE, Ammonia

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/26/2006 10:30	321270	4500-NH3 BE	1	04/27/2006 18:16	OLT	321596
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
7664-41-7	Ammonia	209	1.0		mg/L-N	

## HACH 8000 - COD

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	04/23/2006 09:58	HLO	321011
CAS#	Parameter	Result	RDL	REG LIMIT	Units	
C-004	COD	409	25.0		mg/L	

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211713	UOP-HP-WW2	Water	04/20/2006 12:24	04/21/2006 09:45

### EPA 325.2 Chloride

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	04/21/2006 15:17	AEL	320920
CAS#	Parameter		Result	RDL	REG LIMIT	Units
16887-00-6	Chloride		3370	50.0		mg/L

### 5210B BOD (5 Day)

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/21/2006 15:15	320948	BOD PREP	1	04/21/2006 15:15	CDT	321315
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-002	BOD		>377	2		mg/L

### 9050A Specific Conductance

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/25/2006 11:30	LMC2	321221
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-011	Specific Conductance		12340	10		umhos/cm

### EPA 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	04/25/2006 10:29	AEL	321162
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-012	Total Organic Carbon		235	5.0		mg/L

### EPA 1664A

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
04/23/2006 10:00	321057	O&G 1664A	1	04/24/2006 08:10	RLY	321096
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-007	Oil and Grease		13.7	5.0		mg/L

### EPA 375.4 Sulfate

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	04/25/2006 16:53	HLO	321308
CAS#	Parameter		Result	RDL	REG LIMIT	Units
14808-79-8	Sulfate		39.2	10.0		mg/L

<b>GCAL ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Collect Date/Time</b>	<b>Receive Date/Time</b>
20604211713	UOP-HP:WW2	Water	04/20/2006 12:24	04/21/2006 09:45

## 254Q D, TSS - Water

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/23/2006 10:34	LMC2	321054
CAS#	Parameter		Result	RDL	REG LIMIT	Units
C-009	Total Suspended Solids		1360	1		mg/L

## 4500 H+B / 9040A - pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	04/21/2006 12:30	OLT	320907
CAS#	Parameter		Result	RDL	REG LIMIT	Units
pH	pH		5.55	1.00	12.5	pH unit

# GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	321268	Client ID	MB321121	mg/L	Spike	Result	% R	Control	Result	% R	RPD	Limit
Prep Batch	321121	GCAL ID	361615	RDL	Added			Limits				
Prep Method	3510C	Sample Type	Method Blank					% R				
		Prep Date	04/24/2006 15:00									
		Analytical Date	04/25/2006 11:19									
		Matrix	Water									
<b>SW-846 8270C, TCLP Semi-Voa</b>												
118-74-1	Hexachlorobenzene		ND	0.0500	0.100	0.081	81	61 - 112	0.077	77	5	50
87-68-3	Hexachlorobutadiene		ND	0.0500	0.100	0.068	68	17 - 105	0.065	65	5	50
67-72-1	Hexachloroethane		ND	0.0500	0.100	0.055	55	21 - 130	0.054	54	2	50
95-48-7	o-Cresol		ND	0.0500	0.100	0.051	51	31 - 110	0.050	50	2	50
98-95-3	Nitrobenzene		ND	0.0500	0.100	0.075	75	53 - 113	0.070	70	7	50
95-95-4	2,4,5-Trichlorophenol		ND	0.0500	0.100	0.081	81	60 - 116	0.082	82	1	50
88-06-2	2,4,6-Trichlorophenol		ND	0.0500	0.100	0.091	91	59 - 115	0.077	77	17	50
110-86-1	Pyridine		ND	0.0500	0.100	0.044	44	2 - 130	0.026	26	51*	50
1319-77-3	Cresols		ND	0.1000		0.095			0.095		0	
1319-77-3MP	m,p-Cresol		ND	0.0500	0.100	0.046	46	24 - 104	0.047	47	2	50
106-46-7	1,4-Dichlorobenzene		ND	0.0500	0.100	0.059	59	22 - 104	0.057	57	3	30
121-14-2	2,4-Dinitrotoluene		ND	0.0500	0.100	0.088	88	37 - 138	0.091	91	3	33
87-86-5	Pentachlorophenol		ND	0.1000	0.100	0.071	71	25 - 158	0.069	69	3	32
Surrogate												
4165-60-0	Nitrobenzene-d5		41	82	50	44.6	89	43 - 110	39.9	80		
321-60-8	2-Fluorobiphenyl		35.7	71	50	42.6	85	16 - 128	36.3	73		
1718-51-0	Terphenyl-d14		48	96	50	47.1	94	47 - 121	45.2	90		
4165-62-2	Phenol-d5		24	24	100	29.3	29	10 - 76	29.5	30		
367-12-4	2-Fluorophenol		42	42	100	43.4	43	24 - 96	41.6	42		
118-79-6	2,4,6-Tribromophenol		109	109	100	94.7	95	19 - 133	92.1	92		

Analytical Batch	321268	Client ID	BORROW PIT (TCLP)	mg/L	Spike	Result	% R	Control	Result	% R	RPD	Limit
Prep Batch	321121	GCAL ID	20604220314	RDL	Added			Limits				
Prep Method	3510C	Sample Type	SAMPLE					% R				
		Prep Date	04/24/2006 15:00									
		Analytical Date	04/25/2006 20:21									
		Matrix	Solid									
<b>SW-846 8270C, TCLP Semi-Voa</b>												
118-74-1	Hexachlorobenzene		0.00	0.2500	0.500	0.380	76	61 - 112	0.423	85	11	50
87-68-3	Hexachlorobutadiene		0.00	0.2500	0.500	0.299	60	17 - 105	0.307	61	3	50

# GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch 321268 Prep Batch 321121 Prep Method 3510C		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		BORROW PIT (TCLP) 20604220314 SAMPLE 04/24/2006 15:00 04/25/2006 20:21 Solid		361266MS 361618 MS 04/24/2006 15:00 04/25/2006 20:36 Solid		361266MSD 361619 MSD 04/24/2006 15:00 04/25/2006 20:50 Solid					
SW-846 8270C, TCLP Semi-Voa				Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R	Result	% R	RPD	RPD Limit
67-72-1	Hexachloroethane			0.00	0.2500	0.500	0.240	48	21 - 130	0.250	50	4	50
95-48-7	o-Cresol			0.00	0.2500	0.500	0.239	48	31 - 110	0.243	49	2	50
98-95-3	Nitrobenzene			0.00	0.2500	0.500	0.335	67	53 - 113	0.344	69	3	50
95-95-4	2,4,5-Trichlorophenol			0.00	0.2500	0.500	0.349	70	60 - 116	0.352	70	0.9	50
88-06-2	2,4,6-Trichlorophenol			0.00	0.2500	0.500	0.342	68	59 - 115	0.365	73	7	50
110-86-1	Pyridine			0.00199	0.2500	0.500	0.129	25	2 - 75	0.151	30	16	50
1319-77-3MP	m,p-Cresol			0.00	0.2500	0.500	0.218	44	24 - 104	0.225	45	3	50
106-46-7	1,4-Dichlorobenzene			0.00	0.2500	0.500	0.256	51	22 - 104	0.267	53	4	30
121-14-2	2,4-Dinitrotoluene			0.00	0.2500	0.500	0.441	88	37 - 138	0.433	87	2	33
87-86-5	Pentachlorophenol			0.00	0.5000	0.500	0.339	68	25 - 158	0.341	68	0.6	32
Surrogate													
4165-60-0	Nitrobenzene-d5					250	193	77	43 - 110	199	80		
321-60-8	2-Fluorobiphenyl					250	170	68	16 - 128	186	74		
1718-51-0	Terphenyl-d14					250	207	83	47 - 121	205	82		
4165-62-2	Phenol-d5					500	125	25	10 - 76	127	25		
367-12-4	2-Fluorophenol					500	182	36	24 - 96	186	37		
118-79-6	2,4,6-Tribromophenol					500	441	88	19 - 133	424	85		

# Inorganics Quality Control Summary

Analytical Batch 321098 Prep Batch 320986 Prep Method SW-846 7471A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320986 361194 Method Blank 04/22/2006 14:20 04/25/2006 09:14 Solid	LCS320986 361195 LCS 04/22/2006 14:20 04/25/2006 09:16 Solid	
<b>Soil Mercury 7471A</b>				
7439-97-6	Mercury	Units Result	mg/kg RDL	Spike Added
		ND	0.010	0.25
			Result	% R
			0.28	111
			Control Limits % R	80 - 120

Analytical Batch 321098 Prep Batch 320986 Prep Method SW-846 7471A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 09:17 Solid	360777MS 361197 MS 04/22/2006 14:20 04/25/2006 09:20 Solid	
<b>Soil Mercury 7471A</b>				
7439-97-6	Mercury	Units Result	mg/kg RDL	Spike Added
		0.030	0.010	0.25
			Result	% R
			0.29	104
			Control Limits % R	75 - 125

Analytical Batch 321098 Prep Batch 320986 Prep Method SW-846 7471A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 09:17 Solid	360777DUP 361196 DUP 04/22/2006 14:20 04/25/2006 09:19 Solid	
<b>Soil Mercury 7471A</b>				
7439-97-6	Mercury	Units Result	mg/kg RDL	Spike Added
		0.030	0.010	0.016
			Result	RPD Limit
			61*	20

## Inorganics Quality Control Summary

Analytical Batch 321213 Prep Batch 320983 Prep Method 3050B		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 23:57 Solid		360777MS 361187 MS 04/22/2006 14:20 04/26/2006 00:10 Solid			
SW-846 6010B - Solid - ICP				mg/kg RDL	Spike Added	Result	% R	Control Limits % R	
7429-90-5	Aluminum			17100	8.00	200	17200	51*	75 - 125
7440-38-2	Arsenic			0.0	1.60	20.0	18.3	91	75 - 125
7440-39-3	Barium			4.15	0.40	20.0	23.1	95	75 - 125
7440-43-9	Cadmium			0.0	0.20	20.0	18.4	92	75 - 125
7440-47-3	Chromium			0.0	0.40	20.0	19.6	98	75 - 125
7440-48-4	Cobalt			0.29	0.40	20.0	19.3	95	75 - 125
7440-50-8	Copper			2.58	0.40	20.0	23.7	106	75 - 125
7439-89-6	Iron			178	4.00	200	376	99	75 - 125
7439-92-1	Lead			0.0	0.60	20.0	18.1	90	75 - 125
7439-95-4	Magnesium			29.9	4.00	200	228	99	75 - 125
7439-96-5	Manganese			8.98	0.60	20.0	28.4	97	75 - 125
7439-98-7	Molybdenum			4.65	1.20	20.0	23.3	93	75 - 125
7440-02-0	Nickel			20.4	1.60	20.0	40.2	99	75 - 125
7782-49-2	Selenium			0.58	1.60	20.0	20.2	98	75 - 125
7440-22-4	Silver			0.0	0.40	20.0	20.1	100	75 - 125
7440-28-0	Thallium			2.70	0.55	20.0	21.1	92	75 - 125
7440-66-6	Zinc			6.29	0.80	20.0	27.0	104	75 - 125

Analytical Batch		Client ID	UOP-HP-SW1		360777DUP	
321213	Prep Batch	GCAL ID	20604211701	361186		
320983	Prep Method	Sample Type	SAMPLE	DUP		
3050B		Prep Date	04/22/2006 14:20	04/22/2006 14:20		
		Analytical Date	04/25/2006 23:57	04/26/2006 00:03		
		Matrix	Solid	Solid		
SW-846 6010B - Solid - ICP						
7429-90-5	Aluminum		Units	mg/kg	Result	RPD
			Result	RDL		Limit
7440-38-2	Arsenic		17100	8.00	17200	0.6
			0.0	1.60	0.0	0
7440-39-3	Barium		4.15	0.40	4.12	0.7
						20
7440-43-9	Cadmium		0.0	0.20	0.0	0
						20
7440-47-3	Chromium		0.0	0.40	0.0	0
						20

Analytical Batch 321213 Prep Batch 320983 Prep Method 3050B		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 23:57 Solid		360777DUP 361186 DUP 04/22/2006 14:20 04/26/2006 00:03 Solid		
SW-846 6010B - Solid - ICP				Units	mg/kg	Result	RPD	RPD Limit
7440-48-4	Cobalt			Result	RDL	0.29	0	20
7440-50-8	Copper			2.58	0.40	2.58	0	20
7439-89-6	Iron			178	4.00	173	3	20
7439-92-1	Lead			0.0	0.60	0.0	0	20
7439-95-4	Magnesium			29.9	4.00	29.8	0.3	20
7439-96-5	Manganese			8.98	0.60	9.08	1	20
7439-98-7	Molybdenum			4.65	1.20	4.69	0.9	20
7440-02-0	Nickel			20.4	1.60	20.3	0.5	20
7782-49-2	Selenium			0.58	1.60	0.71	20	20
7440-22-4	Silver			0.0	0.40	0.0	0	20
7440-28-0	Thallium			2.70	0.55	2.69	0.4	20
7440-66-6	Zinc			6.29	0.80	6.48	3	20

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# Inorganics Quality Control Summary

Analytical Batch 321332 Prep Batch 320983 Prep Method 3050B	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320983 361184 Method Blank 04/22/2006 14:20 04/26/2006 18:07 Solid	LCS320983 361185 LCS 04/22/2006 14:20 04/26/2006 18:14 Solid		
<b>SW-846 6010B - Solid - ICP</b>					
7439-96-5 Manganese	Units Result	mg/kg RDL	Spike Added	Result	% R Control Limits % R
7439-98-7 Molybdenum	ND	0.60	20.0	19.2	96 80 - 120
7440-02-0 Nickel	ND	1.20	20.0	20.0	100 80 - 120
7782-49-2 Selenium	ND	1.60	20.0	19.0	95 80 - 120
7440-22-4 Silver	ND	1.60	20.0	18.6	93 80 - 120
7440-23-5 Sodium	ND	0.40	20.0	19.4	97 80 - 120
7440-28-0 Thallium	ND	40.0	800	795	99 80 - 120
7440-66-6 Zinc	ND	0.55	20.0	19.8	99 80 - 120
	ND	0.80	20.0	19.1	96 80 - 120

Analytical Batch 321332 Prep Batch 320983 Prep Method 3050B	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 23:57 Solid	360777MS 361187 MS 04/22/2006 14:20 04/26/2006 18:31 Solid		
<b>SW-846 6010B - Solid - ICP</b>					
7440-23-5 Sodium	Units Result	mg/kg RDL	Spike Added	Result	% R Control Limits % R
	2200	40.0	800	2960	96 75 - 125

Analytical Batch 321332 Prep Batch 320983 Prep Method 3050B	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/22/2006 14:20 04/25/2006 23:57 Solid	360777DUP 361186 DUP 04/22/2006 14:20 04/26/2006 18:26 Solid		
<b>SW-846 6010B - Solid - ICP</b>					
7440-23-5 Sodium	Units Result	mg/kg RDL	Spike Added	Result	% R Control Limits % R
	2200	40.0	800	2960	96 75 - 125

# Inorganics Quality Control Summary

Analytical Batch Prep Batch Prep Method	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB321768 364295 LCS 05/01/2006 11:45 05/03/2006 00:05 Water			
		SW-846 6010B ICP	Units Result	mg/L RDL	Spike Added
7440-70-2	Calcium	ND	5.00	0.10	5.00
7440-47-3	Chromium	ND	0.50	0.010	0.50
7440-48-4	Cobalt	ND	0.50	0.010	0.50
7439-98-7	Molybdenum	ND	0.50	0.050	0.50
7440-02-0	Nickel	ND	0.50	0.030	0.50
7440-22-4	Silver	ND	0.50	0.010	0.50
7440-23-5	Sodium	ND	20.0	1.00	20.0
			Result	% R	Control Limits % R
			5.21	104	80 - 120
			0.53	107	80 - 120
			0.53	106	80 - 120
			0.53	105	80 - 120
			0.54	108	80 - 120
			0.53	106	80 - 120
			20.8	104	80 - 120

Analytical Batch Prep Batch Prep Method	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	EOB-MW046-CBGW0001 (1) 20604290122 SAMPLE 05/01/2006 11:45 05/03/2006 16:42 Water			
		SW-846 6010B ICP	Units Result	mg/L RDL	Spike Added
7440-23-5	Sodium	1530	5.00	20.0	20.0
			Result	% R	Control Limits % R
			1230	-2000*	75 - 125
			1490	-200*	19
				RPD Limit	20

# Inorganics Quality Control Summary

Analytical Batch 321205 Prep Batch 321140 Prep Method 3010A		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		MB321140 361662 Method Blank 04/24/2006 14:00 04/25/2006 07:45 Water		LCS321140 361663 LCS 04/24/2006 14:00 04/25/2006 07:52 Water			
SW-846 6010B, TCLP Metals				Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
7440-38-2		Arsenic		ND	0.20	0.50	0.51	102	80 - 120
7440-39-3		Barium		ND	1.00	0.50	0.50	100	80 - 120
7440-43-9		Cadmium		ND	0.010	0.50	0.52	104	80 - 120
7440-47-3		Chromium		ND	0.050	0.50	0.50	99	80 - 120
7439-92-1		Lead		ND	0.10	0.50	0.51	103	80 - 120
7782-49-2		Selenium		ND	0.10	0.50	0.62	124*	80 - 120
7440-22-4		Silver		ND	0.050	0.50	0.53	106	80 - 120

Analytical Batch 321205 Prep Batch 321140 Prep Method 3010A		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		DESSICANT 20604204001 SAMPLE 04/24/2006 14:00 04/25/2006 07:59 Solid		360534MS 361665 MS 04/24/2006 14:00 04/25/2006 08:06 Solid		360534MSD 361666 MSD 04/24/2006 14:00 04/25/2006 08:11 Solid		RPD Limit		
SW-846 6010B, TCLP Metals				Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R	Result	% R	RPD
7440-38-2 Arsenic				0.0	0.20	0.50	0.46	91	75 - 125	0.46	92	0
7440-39-3 Barium				0.50	1.00	0.50	1.0	100	75 - 125	1.04	108	4
7440-43-9 Cadmium				0.00034	0.010	0.50	0.49	98	75 - 125	0.50	101	2
7440-47-3 Chromium				0.0	0.050	0.50	0.47	94	75 - 125	0.48	97	2
7439-92-1 Lead				0.013	0.10	0.50	0.50	98	75 - 125	0.50	98	0
7782-49-2 Selenium				0.0079	0.10	0.50	0.55	109	75 - 125	0.55	109	0
7440-22-4 Silver				0.0018	0.050	0.50	0.50	100	75 - 125	0.52	103	4

# Inorganics Quality Control Summary

Analytical Batch 321201 Prep Batch 321141 Prep Method SW-846 7470A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB321141 361667 Method Blank 04/24/2006 14:00 04/25/2006 15:49 Water	LCS321141 361668 LCS 04/24/2006 14:00 04/25/2006 15:50 Water	Control Limits % R
<b>SW-846 7470A, TCLP Mercury</b>				% R
7439-97-6	Mercury	ND	0.00020	0.00538
				108
				80 - 120

Analytical Batch 321201 Prep Batch 321141 Prep Method SW-846 7470A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	DESSICANT 20604204001 SAMPLE 04/24/2006 14:00 04/25/2006 15:52 Solid	360534MS 361670 MS 04/24/2006 14:00 04/25/2006 15:55 Solid	Control Limits % R
<b>SW-846 7470A, TCLP Mercury</b>				% R
7439-97-6	Mercury	0.00000	0.00020	0.00546
				109
				75 - 125

Analytical Batch 321201 Prep Batch 321141 Prep Method SW-846 7470A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	DESSICANT 20604204001 SAMPLE 04/24/2006 14:00 04/25/2006 15:52 Solid	360534DUP 361669 DUP 04/24/2006 14:00 04/25/2006 15:53 Solid	RPD Limit
<b>SW-846 7470A, TCLP Mercury</b>				RPD
7439-97-6	Mercury	0.00000	0.00020	0
				20

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	321053 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB321053 361440 Method Blank 04/23/2006 10:20 Water	LCS321053 361441 LCS 04/23/2006 10:20 Water
<b>EPA 160.1, TDS</b>				
WET-035	Total Dissolved Solids(TDS)		Units Result	mg/L RDL
			ND	10.0
			Spike Added	1000
			Result	980
			% R	98
			Control Limits % R	80 - 120

Analytical Batch Prep Batch	321053 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	31434-06 20604212701 SAMPLE 04/23/2006 10:20 Water	361024DUP 361442 DUP 04/23/2006 10:20 Water
<b>EPA 160.1, TDS</b>				
WET-035	Total Dissolved Solids(TDS)		Units Result	mg/L RDL
			47700	10.0
			Result	47500
			RPD Limit	0.42
			RPD Limit	25

# General Chemistry Quality Control Summary

Analytical Batch 321264	Client ID	MB321263		LCS321263
Prep Batch 321263	GCAL ID	362179		362180
Prep Method EPA 353.2	Sample Type	Method Blank		LCS
	Prep Date	04/24/2006 17:15		04/24/2006 17:15
	Analytical Date	04/25/2006 17:18		04/25/2006 17:19
	Matrix	Solid		Solid
EPA 353.2 Nitrate		Units Result	mg/kg-N RDL	Spike Added
		ND	0.100	5.00
14797-55-8 Nitrate				

Analytical Batch 321264 Prep Batch 321263 Prep Method EPA 353.2	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	OBS-1 (0-1) 20604220104 SAMPLE 04/24/2006 17:15 04/25/2006 18:13 Solid	mg/kg-N RDL	Units Result	Spike Added	Result	% R	Control Limits % R
EPA 353.2 Nitrate				32.6	2.00	133	101	75 - 125
14797-55-8 Nitrate					100			

Analytical Batch 321264	Client ID	OBS-1 (0-1)	361224DUP		
Prep Batch 321263	GCAL ID	20604220104	362184		
Prep Method EPA 353.2	Sample Type	SAMPLE	DUP		
	Prep Date	04/24/2006 17:15	04/24/2006 17:15		
	Analytical Date	04/25/2006 18:13	04/25/2006 18:14		
	Matrix	Solid	Solid		
EPA 353.2 Nitrate		Units Result	Result	RPD	RPD Limit
14797-55-8 Nitrate		32.6	32.9	0.9	25

# General Chemistry Quality Control Summary

Analytical Batch 320966 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	UOP-HP-SW7 20604211712 SAMPLE 04/21/2006 18:25 Solid	360790DUP 361113 DUP 04/21/2006 18:25 Solid
<b>2540 G Total Solids - Solid</b>			
C-008	Total Solids	Units Result 14.1	% RDL 0.010
		Result 14.6	RPD Limit 25
			RPD Limit 3.5

# General Chemistry Quality Control Summary

Analytical Batch 321020 Prep Batch 320924 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320924 360947 Method Blank 04/22/2006 09:00 04/22/2006 11:30 Solid	LCS320924 360948 LCS 04/22/2006 09:00 04/22/2006 11:30 Solid
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/kg-N RDL	Spike Added
7664-41-7 Ammonia	ND	200	3000
			Result
			% R
			Control Limits % R
			2480
			83
			80 - 120

Analytical Batch 321020 Prep Batch 320924 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW8 20604211711 SAMPLE 04/22/2006 09:00 04/22/2006 11:30 Solid	360789MS 360949 MS 04/22/2006 09:00 04/22/2006 11:30 Solid
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/kg-N RDL	Spike Added
7664-41-7 Ammonia	8640	200	3000
			Result
			% R
			Control Limits % R
			12200
			119
			75 - 125

Analytical Batch 321020 Prep Batch 320924 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW7 20604211712 SAMPLE 04/22/2006 09:00 04/22/2006 11:30 Solid	360790DUP 360950 DUP 04/22/2006 09:00 04/22/2006 11:30 Solid
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/kg-N RDL	Spike Added
7664-41-7 Ammonia	15700	200	17900
			Result
			RPD Limit
			13
			25

# General Chemistry Quality Control Summary

Analytical Batch 321126 Prep Batch 320923 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320923 360943 Method Blank 04/22/2006 07:30 04/23/2006 13:14 Solid	LCS320923 360944 LCS 04/22/2006 07:30 04/23/2006 13:14 Solid
<b>TKN 4500 NH3-BE</b>	Units Result	mg/kg-N RDL	Spike Added
C-021 Total Kjeldahl Nitrogen	ND	200	3000
		% R	Control Limits % R
		93.3	80 - 120
		Result	
		2800	

Analytical Batch 321126 Prep Batch 320923 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW8 20604211711 SAMPLE 04/22/2006 07:30 04/23/2006 13:14 Solid	360789MS 360945 MS 04/22/2006 07:30 04/23/2006 13:14 Solid
<b>TKN 4500 NH3-BE</b>	Units Result	mg/kg-N RDL	Spike Added
C-021 Total Kjeldahl Nitrogen	7630	200	3000
		% R	Control Limits % R
		79.9	75 - 125
		Result	
		10000	

Analytical Batch 321126 Prep Batch 320923 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW7 20604211712 SAMPLE 04/22/2006 07:30 04/23/2006 13:14 Solid	360790DUP 360946 DUP 04/22/2006 07:30 04/23/2006 13:14 Solid
<b>TKN 4500 NH3-BE</b>	Units Result	mg/kg-N RDL	Spike Added
C-021 Total Kjeldahl Nitrogen	10000	200	10500
		% R	Control Limits % R
		4.9	25
		Result	
		10500	

# General Chemistry Quality Control Summary

Analytical Batch 321596 Prep Batch 321270 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB321270 362195 Method Blank 04/26/2006 10:30 04/27/2006 18:16 Water	LCS321270 362196 LCS 04/26/2006 10:30 04/27/2006 18:16 Water
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Spike Added
7664-41-7 Ammonia	ND	1.0	15.0
		Result	% R
		15.1	101
		Control Limits % R	80 - 120

Analytical Batch 321596 Prep Batch 321270 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	PLANT EFF. 20604241901 SAMPLE 04/26/2006 10:30 04/27/2006 18:16 Water	361631MS 362197 MS 04/26/2006 10:30 04/27/2006 18:16 Water
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Spike Added
7664-41-7 Ammonia	0.00	1.0	15.0
		Result	% R
		13.7	91
		Control Limits % R	74.6 - 125

Analytical Batch 321596 Prep Batch 321270 Prep Method 4500-NH3 BE	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	PT-NUT-WP(1), Lot #8049-10 20604174208 SAMPLE 04/26/2006 10:30 04/27/2006 18:16 Water	359065DUP 362198 DUP 04/26/2006 10:30 04/27/2006 18:16 Water
<b>EPA 4500-NH3 BE, Ammonia</b>	Units Result	mg/L-N RDL	Result
7664-41-7 Ammonia	1.6	1.0	1.6
		RPD Limit	RPD Limit
		.0	25

General Chemistry Quality Control Summary

Analytical Batch 320980 Prep Batch N/A	Client ID		NON PROCESS SOLIDS		360496DUP	
	GCAL ID	20604203501	SAMPLE		361179	
9045C Solid - pH	Sample Type	04/21/2006 17:00	Solid		DUP	
	Analytical Date Matrix	04/21/2006 17:00	Solid		04/21/2006 17:00	
			Units	Result	pH unit	RPD
			7.22	1.00	7.25	0.4
					RPD Limit	6
pH						

# General Chemistry Quality Control Summary

Analytical Batch 321011 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB321011 361332 Method Blank 04/23/2006 09:53 Water	LCS321011 361333 LCS 04/23/2006 09:53 Water		
<b>HACH 8000 - COD</b>					
C-004	COD	Units Result ND	mg/L RDL 5.0	Spike Added 75.0	Result 72.4 % R 97 Control Limits % R 80 - 120

Analytical Batch 321011 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	004 20604194801 SAMPLE 04/23/2006 09:54 Water	359904MS 361335 MS 04/23/2006 09:55 Water		
<b>HACH 8000 - COD</b>					
C-004	COD	Units Result 6.6	mg/L RDL 5.0	Spike Added 75.0	Result 74.9 % R 91 Control Limits % R 75 - 125

Analytical Batch 321011 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	004 20604194801 SAMPLE 04/23/2006 09:54 Water	359904DUP 361334 DUP 04/23/2006 09:54 Water		
<b>HACH 8000 - COD</b>					
C-004	COD	Units Result 6.6	mg/L RDL 5.0	Result 7.7 RPD 15 RPD Limit 25	

# General Chemistry Quality Control Summary

Analytical Batch 320920 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB320920 360927 Method Blank 04/21/2006 14:52 Water	LCS320920 360928 LCS 04/21/2006 14:53 Water
<b>EPA 325.2 Chloride</b>			
16887-00-6 Chloride	Units Result ND	mg/L RDL 1.0	Spike Added 60.0
		Result 63.2	% R 105
		Control Limits % R 80 - 120	

Analytical Batch 320920 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM02-200D 20604134707 SAMPLE 04/21/2006 14:55 Water	CM02-200D MS 20604134711 MS 04/21/2006 14:57 Water
<b>EPA 325.2 Chloride</b>			
16887-00-6 Chloride	Units Result 24.5	mg/L RDL 1.0	Spike Added 60.0
		Result 87.4	% R 105
		Control Limits % R 75 - 125	

Analytical Batch 320920 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	CM02-200D 20604134707 SAMPLE 04/21/2006 14:55 Water	CM02-200D MD 20604134713 DUP 04/21/2006 14:56 Water
<b>EPA 325.2 Chloride</b>			
16887-00-6 Chloride	Units Result 24.5	mg/L RDL 1.0	Result 24.5
		RPD Limit 25	

# General Chemistry Quality Control Summary

Analytical Batch 321853 Prep Batch 321852 Prep Method EPA 9251	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB321852 364687 Method Blank 04/28/2006 12:05 05/02/2006 09:33 Solid	LCS321852 364688 LCS 04/28/2006 12:05 05/02/2006 09:35 Solid
<b>9251 Chloride</b>	Units Result	mg/kg RDL	Spike Added
16887-00-6 Chloride	ND	10.0	600
			Result 599
			% R 100
			Control Limits % R 80 - 120

Analytical Batch 321853 Prep Batch 321852 Prep Method EPA 9251	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/28/2006 12:05 05/02/2006 10:20 Solid	360777MS 364690 MS 04/28/2006 12:05 05/02/2006 10:22 Solid
<b>9251 Chloride</b>	Units Result	mg/kg RDL	Spike Added
16887-00-6 Chloride	20400	500	30000
			Result 47700
			% R 91
			Control Limits % R 75 - 125

Analytical Batch 321853 Prep Batch 321852 Prep Method EPA 9251	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/28/2006 12:05 05/02/2006 10:20 Solid	360777DUP 364689 DUP 04/28/2006 12:05 05/02/2006 10:21 Solid
<b>9251 Chloride</b>	Units Result	mg/kg RDL	RPD Limit
16887-00-6 Chloride	20400	500	19500
			Result 5
			RPD Limit 25

# General Chemistry Quality Control Summary

Analytical Batch 321315		Client ID	LCS320948				
Prep Batch 320948		GCAL ID	361035				
Prep Method BOD PREP		Sample Type	LCS				
		Prep Date	04/21/2006 13:00				
		Analytical Date	04/21/2006 13:00				
		Matrix	Water				
5210B BOD (5 Day)				Spike Added	Result	% R	Control Limits % R
				198	168	85	83.5 - 115.5
C-002	BOD						

Analytical Batch 321315		Client ID	210253 OTFL 2001	210253 OTFL 2001 (DUP)
Prep Batch 320948		GCAL ID	20604213501	20604213502
Prep Method BOD PREP		Sample Type	SAMPLE	DUP
		Prep Date	04/21/2006 16:30	04/21/2006 16:30
		Analytical Date	04/21/2006 16:30	04/21/2006 16:30
		Matrix	Water	Water
5210B BOD (5 Day)				
C-002	BOD		Units Result 7	Result 7
			mg/L RDL 2	RPD 0
				RPD Limit 25

# General Chemistry Quality Control Summary

Analytical Batch 321221 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	UOP-HP-WW2 20604211713 SAMPLE 04/25/2006 11:30 Water	360791DUP 361996 DUP 04/25/2006 11:30 Water	RPD Limit
<b>9050A Specific Conductance</b>		Units Result umhos/cm RDL	Result	RPD Limit
C-011 Specific Conductance		12340 10	12200	1 10

Analytical Batch 322002 Prep Batch 321981 Prep Method 9050A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW7 20604211712 SAMPLE 05/03/2006 10:30 05/03/2006 10:30 Solid	360790DUP 365208 DUP 05/03/2006 10:30 05/03/2006 10:30 Solid	RPD Limit
<b>9050A Specific Conductance</b>		Units Result umhos/cm RDL	Result	RPD Limit
C-011 Specific Conductance		9010 100	8820	2

# General Chemistry Quality Control Summary

Analytical Batch 321162 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix		MB321162 361736 Method Blank 04/25/2006 09:36 Water		LCS321162 361737 LCS 04/25/2006 09:54 Water			
EPA 5310B TOC				Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R
C-012 Total Organic Carbon				ND	1.0	50.0	50.0	100	80 - 120

## EPA 5310B TOC

Analytical Batch 321162 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	DEQ-P	361690MS		361690MSD	
		20604242104	361739	361866		
		SAMPLE	MS	MSD		
		04/25/2006 16:48	04/25/2006 17:23	04/25/2006 17:41		
		Water	Water			Water
EPA 5310B TOC						
C-012	Total Organic Carbon	Units Result	mg/L RDL	Spike Added	Control Limits % R	RPD Limit
		3.9	10	50.0	75 - 125	25
	</					

361690MSD  
361866  
MSD  
04/25/2006 17:41  
Water

## EPA 5310B TOC

Analytical Batch 321162 Prep Batch N/A		Client ID GCAL ID Sample Type Analytical Date Matrix		DEQ-P 20604242104 SAMPLE 04/25/2006 16:48 Water		361690DUP 361738 DUP 04/25/2006 17:05 Water	
EPA 5310B TOC				Units Result	mg/L RDL	Result	RPD L/limit
C-012	Total Organic Carbon			3.9	1.0	3.7	5 25

## EPA 5310B TOC

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	322179 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB322179 366172 Method Blank 05/04/2006 10:00 Solid	LCS322179 366173 LCS 05/04/2006 10:00 Solid		
<b>SW-846 9060M TOC</b>		Units Result	mg/kg RDL	Spike Added	Result	% R Control Limits % R
C-012 Total Organic Carbon		ND	200	2000	1960	98 69 - 128

Analytical Batch Prep Batch	322179 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 05/04/2006 10:00 Solid	360777DUP 366174 DUP 05/04/2006 10:00 Solid		
<b>SW-846 9060M TOC</b>		Units Result	mg/kg RDL	Result	RPD Limit	RPD Limit
C-012 Total Organic Carbon		148000	200	138000	7	25

Analytical Batch Prep Batch	322179 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 05/04/2006 10:00 Solid	360777DUP 366176 DUP 05/04/2006 10:00 Solid		
<b>SW-846 9060M TOC</b>		Units Result	mg/kg RDL	Result	RPD Limit	RPD Limit
C-012 Total Organic Carbon		148000	200	140000	6	25

# General Chemistry Quality Control Summary

Analytical Batch 321096		Client ID		MB321057		LCS321057		LCS321057		LCSD321057		
Prep Batch 321057		GCAL ID		361451		361452		361453		361453		
Prep Method O&G 1664A		Sample Type		Method Blank		LCS		LCSD		LCSD		
		Prep Date		04/23/2006 10:00		04/23/2006 10:00		04/23/2006 10:00		04/23/2006 10:00		
		Analytical Date		04/24/2006 08:10		04/24/2006 08:10		04/24/2006 08:10		04/24/2006 08:10		
		Matrix		Water		Water		Water		Water		
EPA 1664A				Units Result	mg/L RDL	Spike Added	Result	% R	Control Limits % R	Result	% R	RPD
				ND	5.0	40.0	34.4	86	78 - 114	37.0	92	7
C-007	Oil and Grease											

# General Chemistry Quality Control Summary

Analytical Batch 321498		Client ID		MB321496		LCS321496			
Prep Batch 321496		GCAL ID		362902		362903			
Prep Method 5050		Sample Type		Method Blank		LCS			
		Prep Date		04/24/2006 17:15		04/24/2006 17:15			
		Analytical Date		04/27/2006 15:05		04/27/2006 15:23			
		Matrix		Solid		Solid			
SW-846 9056				Units Result	mg/kg RDL	Spike Added	Result	% R	Control Limits % R
				ND	1.00	50.0	50.8	102	80 - 120
16984-48-8		Fluoride							

Analytical Batch 321498		Client ID		UOP-HP-SW1				360777MS	
Prep Batch 321496		GCAL ID		20604211701				362905	
Prep Method 5050		Sample Type		SAMPLE				MS	
		Prep Date		04/24/2006 17:15				04/24/2006 17:15	
		Analytical Date		05/03/2006 16:34				05/03/2006 17:09	
		Matrix		Solid				Solid	
				Units Result		mg/kg RDL		Spike Added	
				0.000		1.00		50.0	
								Result	
								% R	
								Control	
								Limits % R	
								75 - 125	
SW-846 9056									
16984-48-8		Fluoride							

Analytical Batch 321498 Prep Batch 321496 Prep Method 5050		Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW1 20604211701 SAMPLE 04/24/2006 17:15 05/03/2006 16:34 Solid	mg/kg RDL 1.00	360777DUP 362904 DUP 04/24/2006 17:15 05/03/2006 16:52 Solid	RPD Limit 0	25
SW-846 9056			Units Result 0.000		Result 0.000	RPD Limit 0	25
16984-48-8	Fluoride						

# General Chemistry Quality Control Summary

Analytical Batch 321190 Prep Batch 320922 Prep Method 3060A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320922 360939 Method Blank 04/24/2006 10:00 04/25/2006 08:29 Solid	LCS320922 360940 LCS 04/24/2006 10:00 04/25/2006 08:30 Solid
<b>7196A Solid Hex Chromium</b>			
18540-29-9	Chromium VI	Units Result ND	mg/kg RDL 1.00
		Spike Added 100	Result 80.6
		% R 80.6	Control Limits % R 75 - 125

Analytical Batch 321190 Prep Batch 320922 Prep Method 3060A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW8 20604211711 SAMPLE 04/24/2006 10:00 04/25/2006 08:39 Solid	360789MS 360941 MS 04/24/2006 10:00 04/25/2006 08:40 Solid
<b>7196A Solid Hex Chromium</b>			
18540-29-9	Chromium VI	Units Result 0.000	mg/kg RDL 1.00
		Spike Added 100	Result 37.8
		% R 37.8*	Control Limits % R 75 - 125

Analytical Batch 321190 Prep Batch 320922 Prep Method 3060A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW7 20604211712 SAMPLE 04/24/2006 10:00 04/25/2006 08:41 Solid	360790DUP 360942 DUP 04/24/2006 10:00 04/25/2006 08:42 Solid
<b>7196A Solid Hex Chromium</b>			
18540-29-9	Chromium VI	Units Result 0.000	mg/kg RDL 1.00
		Spike Added 0.000	Result 0.000
		RPD Limit 0	RPD Limit 25

# General Chemistry Quality Control Summary

Analytical Batch 321073 Prep Batch 320921 Prep Method 9012A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320921	mg/kg RDL	Units Result	Spike Added	Result	% R	Control Limits % R
		360934						
		Method Blank						
		04/22/2006 08:00						
		04/23/2006 14:42						
		Solid				Solid		
9012A Cyanide								
57-12-5	Cyanide, Total			ND	1.00	1.21	120	80 - 120

Analytical Batch 321073 Prep Batch 320921 Prep Method 9012A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320921 360934 Method Blank 04/22/2006 08:00 04/23/2006 14:42 Solid	mg/kg RDL	Units Result ND	Spike Added 5.00	Result 4.27	% R 85	Control Limits % R 80 - 120
9012A Cyanide								
57-12-5	Cyanide, Total							

Analytical Batch 321073 Prep Batch 320921 Prep Method 9012A	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	9281-30	mg/kg RDL	Units Result	Spike Added	Result	% R	Control Limits % R
		20604194701						
		SAMPLE						
		04/22/2006 08:00						
		04/23/2006 14:59						
Solid								
9012A Cyanide								
57-12-5	Cyanide, Total	5.94	0.2000	10.0	16.7	108	60 - 120	

# General Chemistry Quality Control Summary

<b>Analytical Batch</b> 321073 <b>Prep Batch</b> 320921 <b>Prep Method</b> 9012A	<b>Client ID</b> 9281-30 <b>GCAL ID</b> 20604194701 <b>Sample Type</b> SAMPLE <b>Prep Date</b> 04/22/2006 08:00 <b>Analytical Date</b> 04/23/2006 14:59 <b>Matrix</b> Solid		<b>359898DUP</b> <b>360937</b> <b>DUP</b> <b>04/22/2006 08:00</b> <b>04/23/2006 15:01</b> <b>Solid</b>	
	<b>9012A Cyanide</b>		<b>Units</b> <b>Result</b> 5.94	<b>mg/kg</b> <b>RDL</b> 0.2000
57-12-5	Cyanide, Total		5.96	25
			0.3	

# General Chemistry Quality Control Summary

Analytical Batch 321937 Prep Batch 321882 Prep Method 9038	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		MB321882 364795 Method Blank 04/28/2006 12:05 05/02/2006 14:23 Solid		LCS321882 364796 LCS 04/28/2006 12:05 05/02/2006 14:24 Solid	
	Units Result		mg/kg RDL	Spike Added	Result	% R Limits % R
Sulfate 9038		ND	50.0	200	185	93 80 - 120
14808-79-8	Sulfate					

Analytical Batch 321937 Prep Batch 321882 Prep Method 9038	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		UOP-HP-SW1 20604211701 SAMPLE 04/28/2006 12:05 05/02/2006 14:31 Solid		360777MS 364798 MS 04/28/2006 12:05 05/02/2006 14:32 Solid	
	Units Result		mg/kg RDL	Spike Added	Result	% R Limits % R
Sulfate 9038		0.000	50.0	200	185	92 75 - 125
14808-79-8	Sulfate					

Analytical Batch 321937 Prep Batch 321882 Prep Method 9038	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix		UOP-HP-SW1 20604211701 SAMPLE 04/28/2006 12:05 05/02/2006 14:31 Solid		360777DUP 364797 DUP 04/28/2006 12:05 05/02/2006 14:32 Solid	
	Units Result		mg/kg RDL	Result	RPD Limit	RPD Limit
Sulfate 9038		0.000	50.0	0.000	0	25
14808-79-8	Sulfate					

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	321308 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB321308 362359 Method Blank 04/25/2006 13:48 Water	LCS321308 362360 LCS 04/25/2006 13:51 Water
<b>EPA 375.4 Sulfate</b>				
14808-79-8	Sulfate	Units Result	mg/L RDL	Control Limits % R
		ND	5.0	80 - 120
			Spike Added	% R
			20.0	94
			Result	18.8

Analytical Batch Prep Batch	321308 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MG2-3 20604200102 SAMPLE 04/25/2006 15:24 Water	360066MS 362364 MS 04/25/2006 18:06 Water
<b>EPA 375.4 Sulfate</b>				
14808-79-8	Sulfate	Units Result	mg/L RDL	Control Limits % R
		5.7	5.0	75 - 125
			Spike Added	% R
			20.0	90
			Result	23.6

Analytical Batch Prep Batch	321308 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MG2-3 20604200102 SAMPLE 04/25/2006 15:24 Water	360066DUP 362363 DUP 04/25/2006 18:06 Water
<b>EPA 375.4 Sulfate</b>				
14808-79-8	Sulfate	Units Result	mg/L RDL	RPD Limit
		5.7	5.0	25
			Result	RPD
			4.6	21

# General Chemistry Quality Control Summary

Analytical Batch 321203 Prep Batch 320925 Prep Method 9066	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	MB320925 360951 Method Blank 04/23/2006 08:00 04/25/2006 10:15 Solid	LCS320925 360952 LCS 04/23/2006 08:00 04/25/2006 10:16 Solid
<b>9066 - Total Phenolics</b>			
WET-040	Total Phenolics	Units Result ND	mg/kg RDL 0.2500
		Spike Added 5.00	Result 4.33
		% R 86	Control Limits % R 80 - 120

Analytical Batch 321203 Prep Batch 320925 Prep Method 9066	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW5 20604211708 SAMPLE 04/23/2006 08:00 04/25/2006 10:23 Solid	360786MS 360953 MS 04/23/2006 08:00 04/25/2006 10:25 Solid
<b>9066 - Total Phenolics</b>			
WET-040	Total Phenolics	Units Result 0.4950	mg/kg RDL 0.2500
		Spike Added 5.00	Result 4.77
		% R 86	Control Limits % R 75 - 125

Analytical Batch 321203 Prep Batch 320925 Prep Method 9066	Client ID GCAL ID Sample Type Prep Date Analytical Date Matrix	UOP-HP-SW6 20604211709 SAMPLE 04/23/2006 08:00 04/25/2006 10:26 Solid	360787DUP 360954 DUP 04/23/2006 08:00 04/25/2006 10:29 Solid
<b>9066 - Total Phenolics</b>			
WET-040	Total Phenolics	Units Result 0.3950	mg/kg RDL 0.2500
		Spike Added 5.00	Result 4.77
		% R 86	Control Limits % R 75 - 125

# General Chemistry Quality Control Summary

Analytical Batch Prep Batch	321054 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	MB321054 361443 Method Blank 04/23/2006 10:34 Water	LCS321054 361444 LCS 04/23/2006 10:34 Water
<b>2540 D, TSS - Water</b>		Units Result	mg/L RDL	Spike Added
C-009 Total Suspended Solids		ND	1	50
				Result
				% R
				Control Limits % R
				80
				80 - 120

Analytical Batch Prep Batch	321054 N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	010 DISCHARGE POLY 1 (COMP) 20604212901 SAMPLE 04/23/2006 10:34 Water	361026DUP 361445 DUP 04/23/2006 10:34 Water
<b>2540 D, TSS - Water</b>		Units Result	mg/L RDL	Result
C-009 Total Suspended Solids		8	1	8
				RPD
				Limit
				0
				25

# General Chemistry Quality Control Summary

Analytical Batch 320907 Prep Batch N/A	Client ID GCAL ID Sample Type Analytical Date Matrix	HYDRO WATER 20604211601 SAMPLE 04/21/2006 11:30 Water	360760DUP 360768 DUP 04/21/2006 11:30 Water
4500 H+B / 9040A - pH	Units Result	pH unit RDL	RPD Limit
pH	7.61	1.00	6
	7.63	0.3	





GULF COAST ANALYTICAL LABORATORIES, INC.  
7979 GSRI Avenue, Baton Rouge, Louisiana 70820-7402  
Phone 225.769.4900 • Fax 225.767.5717

## CHAIN OF CUSTODY RECORD

Lab use only	Client Name	Client #	Workorder #	Due Date
425	0463	206042117		5-2-06

<b>Report to:</b>		<b>Bill to:</b>	
Client: <u>URS</u>		Client: _____	
Address: <u>7309 Florida Blvd</u>		Address: _____	
Contact: <u>Baton Rouge, LA</u>		Contact: <u>SAHME</u>	
Phone: <u>225-922-5700</u>		Phone: _____	
Fax: <u>225-922-5714</u>		Fax: _____	
P.O. Number		Project Name/Number	
		<u>#12 Lead Sampling / Sludge Sampling (922778)</u>	
Sampled By: <u>Chad Rogers / Ben Robinson / Todd Homan</u>			
Matrix	Date	Time (2:00)	Sample Description
SL	04/20/05	0745	UAP-HP-SW1
		0745	UAP-HP-SW1 Replicate
		0810	UAP-HP-SW2
		0845	UAP-HP-SW3
		0905	UAP-HP-SW4
		0925	UAP-HP-SW5
		0950	UAP-HP-SW6
		1020	UAP-HP-SW8
		1050	UAP-HP-SW7
		1224	UAP-HP-SW2
Turn Around Time:		<input type="checkbox"/> 24-48 hrs.	<input type="checkbox"/> 3 days
		<input checked="" type="checkbox"/> 1 week	<input type="checkbox"/> Standard
		<input type="checkbox"/> Other	
Note:			
Requiring by: (Signature) <u>Ben Robinson</u> Date: <u>4/20/05</u> Time: <u>1600</u>			
Requiring by: (Signature) <u>Ben Robinson</u> Date: <u>4/20/05</u> Time: <u>1700</u>			
Requiring by: (Signature) <u>ML</u> Date: <u>4-21-06</u> Time: <u>945</u>			

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

2062

WHITE: CLIENT FINAL REPORT - CANARY: LABORATORY - PINK: CLIENT

SCALE 06 11/98

# PRESERVATION CHECKLIST / COOLER RECEIPT

Gulf Coast Analytical Laboratories, Inc.

WO: 206042117  
 Desc:  
 Work ID: UOP ANALYTICAL PROJECT  
 Project Seq: 41567  
 Client: 0463 - URS/WCC  
 Profile: 62129 - UOP - UOP ANALYTICAL PROJECT

Type: D  
 Report: REVIEW\_RPT  
 Status: WP  
 Created: 4/21/2006 11:51  
 QA:  
 PO:

## WORKORDER SAMPLES

Container ID	Type	Preservative	pH PRESERVATIVE			VOA HEADSPACE			CONTAINER CONDITION
			A	U	N/A	A	U	N/A	
20604211701-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211701-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211701-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211702-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211702-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211702-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211703-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211703-2	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211704-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211705-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211705-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211705-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211706-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211706-2	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211707-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK

Container ID	Type	Preservative	pH PRESERVATIVE			VOA HEADSPACE			CONTAINER CONDITION
			A	U	N/A	A	U	N/A	
20604211708-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211708-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211708-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211709-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211709-2	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211710-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211711-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211711-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211711-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211712-1	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211712-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211712-3	4	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
Container ID	Type	Preservative	A	U	N/A	A	U	N/A	CONTAINER CONDITION
20604211713-1	SC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-2	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-3	LC	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-4	LA	H2SO4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-5	4	HCL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-6	LC	NONE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-7	4	H2SO4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK
20604211713-8	OC	HNO3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OK

A = ACCEPTABLE

U = UNACCEPTABLE

N/A = NOT APPLICABLE

COOLER (S) TEMPERATURE

A U

LIMIT = 4C + 1 - 2C

MAXIMUM VOLATILE HEADSPACE BUBBLE 6MM

LABEL(S)  
VERIFIED

CUSTODIAN

Custody Seal

used ☒ Yes ☐ No

in tact ☒ Yes ☐ No

**ATTACHMENT 2**  
**TRAINING OUTLINE**

## **EMERGENCY RESPONSE PLAN**

### **TRAINING OUTLINE**

1. Introduction
2. Procedures and Guidelines
  - A. Control Center
  - B. Notification of Management
  - C. Summary of Responsibilities
  - D. Alarm System and Emergency Equipment
  - E. Injury to Personnel
  - F. Responsibility of Security Officers
  - G. Release of Information
  - H. Severe Weather Alerts
3. Emergency Notification Information
  - A. UOP Management
  - B. Spills and Releases – Agencies
  - C. Permit Excursions – Agencies
4. Fire System Layout and Evacuation
5. Emergency Medical Plan
6. Contingency Plan for Chemical and Waste Spills
7. Other Resources

**APPENDIX M**  
**CLOSURE PLAN**

**F I N A L**

## **APPENDIX M**

### **CLOSURE PLAN NO. 1 POND**

*Prepared for*  
UOP  
Shreveport, Louisiana

June 1, 2006

File No. 19227778.00001



URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, Louisiana 70806  
225/922-5700

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## FIGURES

Figure 1	Site Location Map
Figure 2	No. 1 Pond – Existing Conditions
Figure 3	No. 1 Pond – Conceptual Final Contours After Closure

## ATTACHMENTS

Attachment 1	Document to be Filed in Parish Records Upon Final Closure of No. 1 Wastewater Holding Pond
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This closure plan has been prepared by UOP LLC (UOP) for submittal to the Louisiana Department of Environmental Quality (LDEQ) for the No. 1 Pond at the UOP Shreveport Plant. This plan has been prepared in accordance with LAC 33:VII.521.J and the closure standard of LAC 33:VII.713.E. The closure plan was originally submitted in October 1996. This revised plan incorporates an in-place closure. It provides a general description of the closure and a general closure schedule. More details will be provided in an updated closure plan that will be submitted at least 90 days prior to commencing closure activities.

UOP owns and operates a catalyst manufacturing and regeneration facility near Blanchard, Louisiana in Caddo Parish, approximately 15 miles northwest of Shreveport, Louisiana. The location of the Shreveport Plant is shown in Figure 1.

At the Shreveport Plant, UOP operates a surface impoundment, the No. 1 Pond, subject to the Louisiana Solid Waste Regulations. The No. 1 Pond is located in the northwest part of the plant property and is used for wastewater storage and surge. The pond is about 13 acres in size and reportedly has a maximum depth of about 10 feet. The pond was formed by installing an earthen dike across a small southward flowing drainage basin in the 1950s. In 1985 UOP constructed the intermediate levees that separate the No. 1 and No. 2 Settling Basins from the main body of the pond. The pond is directly adjacent to the Closed Hazardous Waste Pile, which has a Resource Conservation and Recovery Act (RCRA) Post-Closure Permit. Figure 2 shows the existing conditions in the No. 1 Pond.

The No. 1 Pond is used to hold process wastewater only for the UOP Shreveport Plant. Based on wastewater and sludge analyses, the waste sent to the No. 1 Pond is nonhazardous. Process wastewater is the only solid waste stored in the No. 1 Pond. The wastewater held in the pond is non-flammable and non-explosive.

The quality of the water in the No. 1 Pond varies due to rainfall and varying plant operating conditions, i.e., different grades of catalyst are produced, production rates vary, etc. Samples were collected of the No. 1 Pond influent on April 6, 2006 and April 20, 2006. The results are summarized on Table 1.

Based on laboratory analysis, wastewater entering the No. 1 Pond is an aqueous stream with varying amounts of primarily chlorides, sodium, sulfates, ammonia (mostly as ammonium chloride), and calcium. The wastewater also contains suspended solids, mostly alumina catalyst prill fines from the catalyst washing operation.

At least 90 days prior to closure of the No. 1 Pond, UOP will notify the LDEQ in writing of its intent to close the unit. The notification will include an updated closure plan, the date of planned closure, the closure schedule and cost estimate.

UOP proposes an in-place closure that will consist of the following activities:

1. Water will be pumped off and handled in the recycle water treatment (RWT) system prior to the start of closure.
2. Water treatment during closure will include storage, flow equalization, and basic filtration (e.g., sand media vessels) of pond water prior to transfer to the RWT.
3. After water removal, the sludge will be dried/thickened and strengthened by moving and stacking.
4. Drying and strengthening may require mixing with a solidification agent such as lime and/or mixing with the surrounding levee soils. The sludge must achieve sufficient strength to support the cover.
5. After the sludge has attained sufficient strength, a combination of levee soils and imported fill will be brought to the appropriate grade.
6. After the sludge has been dried, additional fill will be placed as necessary and graded to drain and minimize erosion.
7. A cover will be constructed of two feet of imported clay (with permeability less than  $1 \times 10^{-7}$  centimeters/second). A minimum of 6 inches of topsoil will be installed on top of the clay cover to support vegetative growth.
8. A vegetative ground cover will be established to prevent erosion and to return the facility location to a more natural appearance.
9. Other covers that satisfy the purposes of minimizing infiltration of precipitation, fire hazards, odors, vector food and harborage, as well as discouraging scavenging and limiting erosion, may be submitted for consideration by the administrative authority.
10. Abandon recovery wells and address groundwater under RECAP.

A drawing showing the conceptual final contours of the facility is included in Figure 3. An updated drawing of the final contours will be provided in the closure plan to be submitted at least 90 days prior to commencing closure activities.

After completion of the closure, UOP will file a document with the official parish recordkeeper indicating the location and use of the property for solid waste disposal. An example copy is included in Attachment 1 to this closure plan.

It is estimated that the closure will take approximately one year to complete. A detailed closure schedule will be provided in the updated closure plan to be submitted at least 90 days prior to commencing closure activities.

An updated closure and post-closure cost estimate is included in Appendix J.

## TABLES

**TABLE 1**

**NO. 1 POND INFLUENT ANALYTICAL SUMMARY**

<b>Parameter</b>	<b>April 6, 2006 HP-WW1</b>	<b>April 6, 2006 HP-WW1 DUP</b>	<b>April 20, 2006 HP-WW2</b>	<b>Concentration Range in No. 1 Pond (historical monitoring)</b>
pH (Standard Units)	3.61	3.51	5.55	6 to 9
Chloride mg/l	18,700	19,400	3,370	2 to 20,000
Sodium mg/l	2,660	2,410	2,260	50 to 3,000
Sulfate mg/l	39.6	39.7	39.2	50 to 5,700
Calcium mg/l	46.7	45.4	40.6	50 to 200
Cobalt mg/l	0.020	0.018	< 0.010	< 0.010
Chromium mg/l	0.029	0.023	0.067	-
Molybdenum mg/l	0.24	0.21	0.095	0.2 to 1.2
Nickel mg/l	1.70	1.67	2.34	0.02 to 0.22
Silver	0.035	0.036	0.017	1 to 36
Ammonia mg/l- N (mostly ammonium chloride)	3,630	4,640	209	1,200 to 34,000
Specific Conductance (umhos/cm)	60,700	61,800	12,340	10,000 to 3,000,000
Oil and Grease mg/l	27.9	21.8	13.7	1 to 1,000
Total Dissolved Solids (TDS) mg/l	13,800	8,400	6,990	20,000 to 30,000
Total Suspended Solids (TSS) mg/l	2,400	2,870	1,360	-
Total Organic Carbon (TOC) mg/l	3,150	3,050	235	4,000 to 5,000
Biological Oxygen Demand (BOD) mg/l	> 374	> 374	377 < BOD < 600	500 to 1,000
Chemical Oxygen Demand (COD) mg/l	1,730	1,950	409	5,000 to 7,000

## FIGURES

FILE LOCATION: I:\ONEAL CAD\UOP\SHREVEPORT\19227294\CLOSURE PLAN\19227294-CLOSURE PLAN-01.DWG (FIGURE 1)

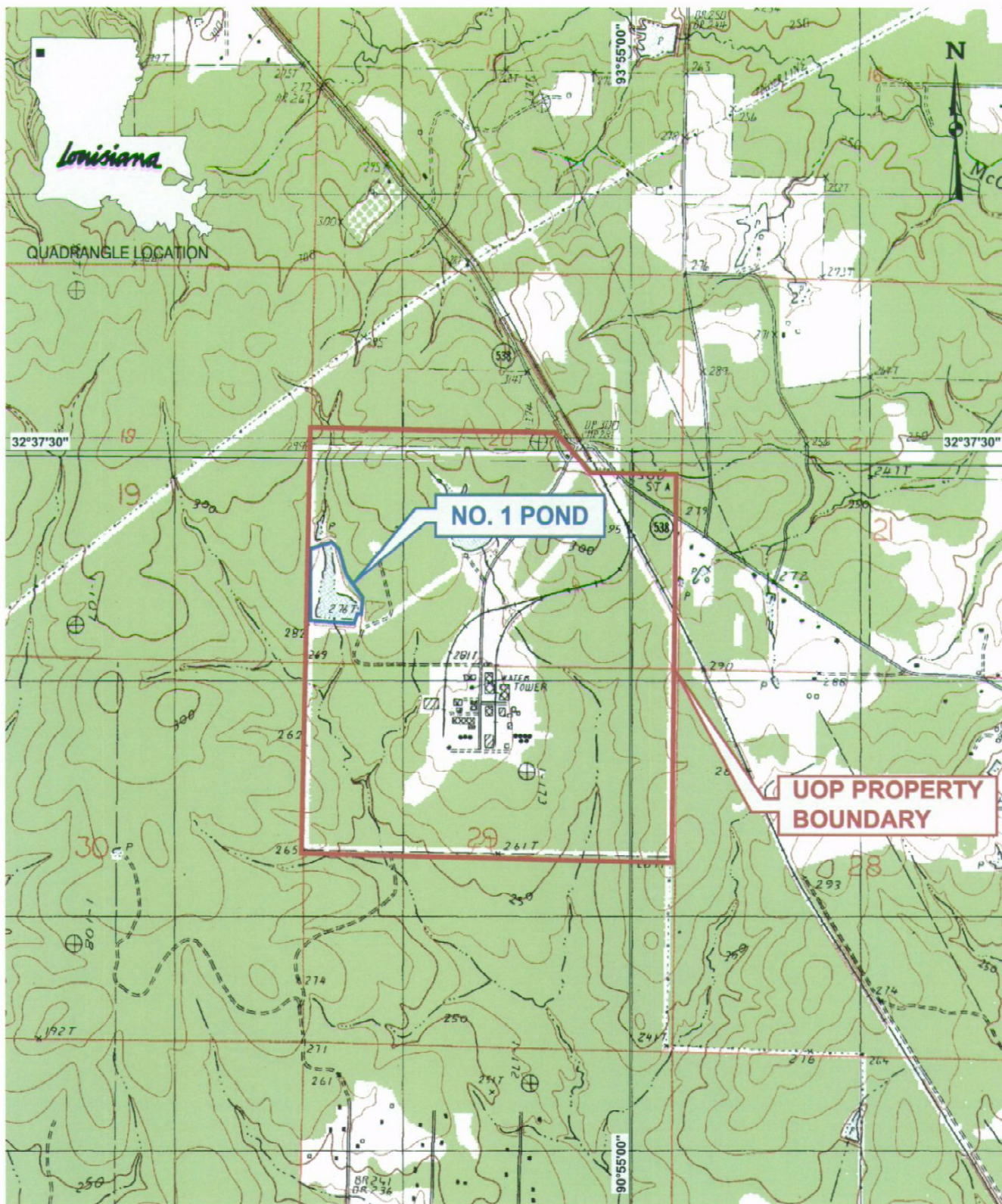


PHOTO SOURCE: USGS QUADRANGLE, 7.5 SERIES, BLANCHARD & MOORINGSPOUT, LOUISIANA, PHOTO DATE PRE 1998 DRG.

SCALE: 1 INCH=2,000 FEET



Shreveport Plant

**URS**

2822 O'Neal Lane  
Baton Rouge, Louisiana 70816  
225/751-1873

SCALE:  
1"=2,000'

DRAWN BY: GAT  
CHKD. BY: MS

DATE: 05/22/06  
DATE: 05/22/06

CLOSURE PLAN

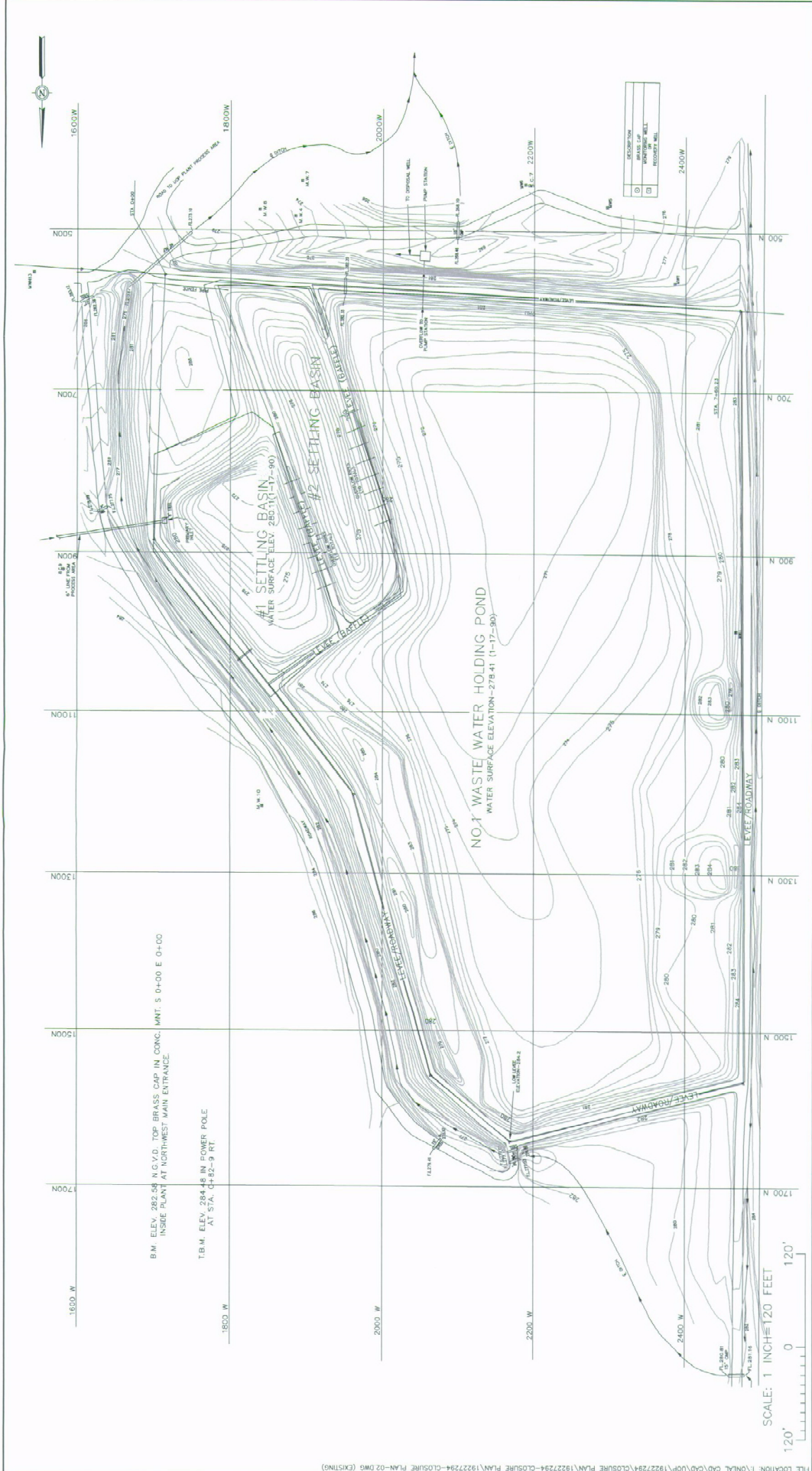
SITE LOCATION MAP

PROJ. NO.

19227294

FIG. NO.

1

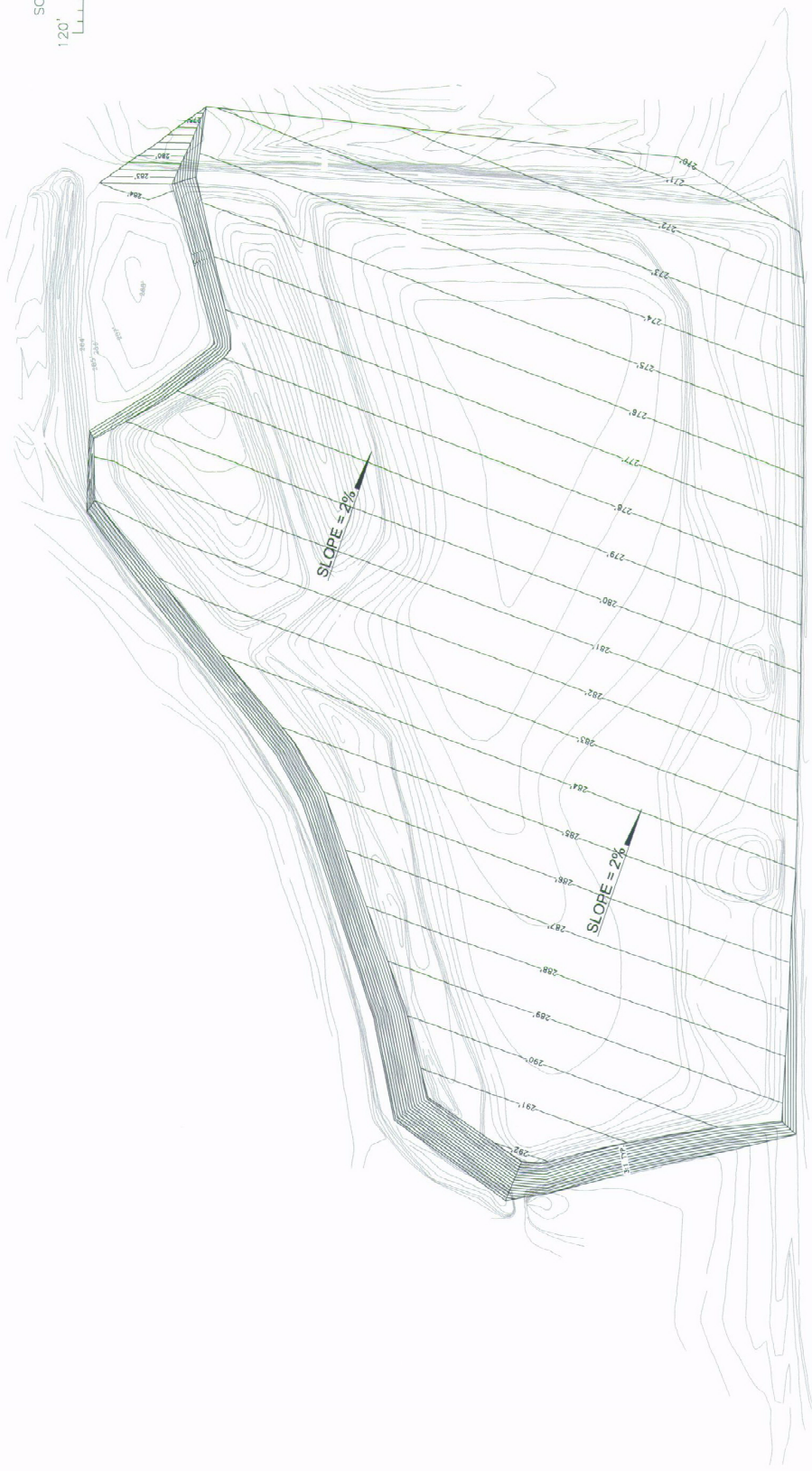


PROJECT 19227294 FIGURE 2		CLOSURE PLAN  NO. 1 POND - EXISTING CONDITIONS		REVISION <div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	
SCALE: 1" = 120' DESIGNED: [Blank] DRAWN: [Blank] CHECKED: [Blank] IN CHARGE: [Blank] DATE: 05/22/06		URS 7389 Florida Blvd., Suite 300 Baton Rouge, Louisiana 70806 225/922-5700		uop Shreveport Plant	
REV	DESCRIPTION OF REVISION	BY	DATE		

FILE LOCATION: I:\ONEAL CAD\CAD\UOP\19227294\CLOSURE PLAN\19227294-CLOSURE PLAN-02.DWG (EXISTING)



SCALE: 1" = 120' FEET  
120' 0 120'



REV	DESCRIPTION OF REVISION	BY	DATE	<div><div>uop</div><div>Shreveport Plant</div></div> <div><div>URS</div><div>7389 Florida Blvd., Suite 300 Baton Rouge, Louisiana 70806 225/922-5700</div></div>	REFERENCE DRAWINGS	SCALE: 1" = 120'		CLOSURE PLAN		REVISION
						DESIGNED	BY: GAT			
						CHECKED	MS			
						PEER REVIEWED	MS			
						DATE	05/22/06	NO. 1 POND - CONCEPTUAL CLOSURE FINAL CONTOURS		FIGURE
										19227504
										3

**ATTACHMENT 1**

**DOCUMENT TO BE FILED IN PARISH RECORDS  
UPON FINAL CLOSURE OF NO. 1 WASTEWATER  
HOLDING POND**

UOP, LLC hereby notifies the public that the following described property was used for the disposal of solid waste. This site was closed on           Date           in accordance with the *Louisiana Administrative Code*, Title 33, Part VII. Inquiries regarding the contents of No. 1 Wastewater Holding Pond may be directed to           Name           at UOP, P.O. Box 21566, Shreveport, LA 71120.

(To be provided upon closure by a surveyor)

Typed Name and Title of Person Filing Parish Record

I:\PROJECTS\WOP SHREVEPORT\1322178 SOLID WASTE PERMITS\WP00001\PERMIT RENEWAL APPL\RSP4005 FRA P0182 ATT10\CP\_7778.TXT DOC11-JUN 06\BTH

**APPENDIX N**  
**GEOTECHNICAL INVESTIGATION**

GEOTECHNICAL INVESTIGATION

MODIFICATION TO WASTE WATER IMPOUNDMENT  
NORTH AND EAST DIKES  
UOP INC.  
SHREVEPORT, LOUISIANA

for:

UOP Inc.  
Shreveport, Louisiana

**Woodward-Clyde Consultants**



Consulting Engineers, Geologists, and Environmental Scientists  
2822 O'Neal Lane, Baton Rouge, LA 70896

2822 O'Neal Lane  
Post Office Box 66317  
Baton Rouge, Louisiana 70896  
504 291-1873

## Woodward-Clyde Consultants

November 4, 1986

Mr. Mark Puett  
Environmental Engineer  
UOP Inc.  
P. O. Box 21566  
Shreveport, Louisiana 71120

Re: Geotechnical Investigation  
Modification to Waste Water Impoundment  
North and East Dikes  
File 86C5134

Dear Mr. Puett:

This report transmits the findings of our geotechnical investigation for the proposed project. This project, authorized by Purchase Order 16770-D, dated September 24, 1986, was performed in general accordance with our proposal of July 14, 1986.

### SITE HISTORY

The structural integrity of the east and north dikes surrounding the waste water impoundment came into question as a result of events initiated by Hurricane Bonnie on June, 1986. During Hurricane Bonnie, the creek previously diverted around the waste water impoundment overflowed its banks and flooded into the impoundment raising its level. The creek reportedly overtopped the north and east dikes at several locations. UOP Inc. requested assistance from WCC on June 30, 1986 to evaluate the status of the south dike. WCC personnel visited the site on July 1 and July 8, 1986. During these site visits and subsequent meetings, the status of the north and east dikes also were discussed. Records concerning the design and specifications to which the north and east dikes were constructed

Consulting Engineers, Geologists  
and Environmental Scientists

Offices in Other Principal Cities



were no longer available. UOP Inc. made the decision to raise the dikes to minimize the potential for a reoccurrence of the creek overtopping and flooding the waste water impoundment.

### SCOPE OF WORK

This investigation was initially divided in four separate phases. Phase 1 was to consist of drilling and sampling four (4) borings through the north and east dikes to a depth of 15 feet. Laboratory tests were to be performed followed by the appropriate engineering analysis. Phase 2 involved the identification and testing of a suitable source of borrow material for dike construction. Phase 3 consisted of developing the design for raising the dikes and generation of the construction specifications. Phase 4 would provide the necessary field supervision and QA/QC controls during construction. This report presents the results of Phases 1 through 3.

### FIELD AND LABORATORY INVESTIGATION

#### Field Investigation - Dikes

The Phase 1 field investigation program consisted of drilling four (4) borings to a depth of 16 feet. The total lineal footage was 64 feet, of which 40 feet were continuously sampled. The borings were drilled on October 1, 1936 using a Failing Model 36 truck-mounted rotary-type drilling rig. The boring locations are shown on Figure 1, Site Plan and Boring Locations.

The top 10 feet of each boring was sampled continuously, while below a depth of 10 feet, samples were generally obtained at 3 to 5 foot intervals. The borings were dry augered their full depth. All borings were grouted by the tremie method upon completion.

Undisturbed samples were obtained using a 3-inch diameter, steel, thin-walled tube sampler advanced hydraulically by the drill rig system. After samples were recovered, they were extruded in the field and visually classified by the field

engineer. As part of the field investigation, cohesive soils were tested with a pocket penetrometer in order to obtain an indication of their relative shear strength. Representative portions were wrapped in foil and placed in plastic bags to minimize moisture loss. Samples were then placed in Styrofoam cartons specially molded so that sample disturbance is minimized while samples are in transit to the laboratory.

#### Field Investigation - Borrow Area

The field investigation for the borrow area was conducted on October 2, 1986. A preliminary survey for sources of onsite borrow material was conducted in June 1985. Based on the preliminary study, UOP decided to further delineate the limits and quantities of borrow material in the southwest corner of the site. The borrow locations are shown on Figure 2, Site Plan for Borrow Locations. A total of eight (8) excavations were made to a depth of approximately 6 feet by a backhoe supplied by UOP Inc. Representative bulk samples of the borrow pits were taken during the excavations and shipped to the laboratory.

#### Laboratory Testing - Dikes

Soil mechanics laboratory tests were performed on selected samples representative of the various strata to estimate their characteristics for foundation support. Laboratory tests included ten (10) unconfined compression tests and one (1) unconsolidated, undrained triaxial compression test to evaluate soil strength parameters for use in evaluating the stability of the existing dikes. Two (2) separate moisture content determinations, nine (9) Atterberg limit determinations and selected visual classifications were also conducted to more accurately classify the subsurface soils than attainable by field examinations. Results of most laboratory tests are presented in the appropriate columns of the boring logs.

### Laboratory Testing - Borrow Area

Soil mechanics laboratory tests were performed on selected bulk samples considered representative of the various strata to define their physical characteristics as suitable borrow material. Laboratory tests included two (2) Standard Proctor (ASTM D 698) tests, six (6) separate moisture content determinations and six (6) Atterberg limit determinations and selected visual classifications to more accurately classify the subsurface soils than attainable by field examinations. Results of most laboratory tests for the borrow material are presented on Table 1, along with the appropriate compaction curves for the fill materials.

### DESCRIPTION OF SITE CONDITIONS

#### Surface Conditions

The north and east dikes provide containment for the waste water impoundment also designated as Pond 1. In addition, the dikes are the western bank for the creek which was diverted in the original construction of the impoundment. Typical profiles of the dikes near the location of Borings B-1 and B-4 are presented on Figure 3. The crown elevations of the north and east dikes, based on UOP's Drawing SH-4330, dated June 1986, range between 281.58 and 283.97 feet. The crown is typically 10 to 14 feet wide. The exterior slope of the dike grades from approximately 2.4(H):1(V) near Boring B-4 to 3.9(H):1(V) near Boring B-1. The exterior slope is covered with heavy vegetation and large trees between Borings B-4 and to just north of Boring B-2. The slope of the north dike grades into the grass covered floodplain of the creek. At the time of the field investigation, the creek was dry. The dredged sludge from Settling Basins Number 1 and 2 has been placed adjacent to the crest of the interior slope of the west dike between Borings B-2 and B-4.

Subsurface Conditions

The attached boring logs present the detailed soil stratifications encountered in the borings. The upper 4 to 8 feet of the subsurface consists of medium to very stiff silty clay and clay fills. Beneath the fills, stiff to very stiff clays were encountered to the bottom of the borings, at a depth of 16 feet. A layer of silt was noted in Boring B-2, at a depth between 10 and 14 feet. A generalized subsurface profile at the location shown on Figure 1 is presented on Figure 4 for evaluation purposes only. The stratification between borings is linearly inferred by correlation of similar soil classifications in adjacent borings. Such correlations only represent our opinion regarding the continuity of stratification with respect to the engineering characteristics of soil materials sampled. Actual subsurface stratifications may differ from the conditions represented on the profile and between samples on the boring logs. If subsurface conditions differing from those presented herein are encountered during site development, then such conditions should be brought to the attention of Woodward-Clyde Consultants for review and/or further detailed investigation so that adjustments to design and construction procedures can be accomplished.

Water Information

Water entered Borings B-2 and B-3 at depths between 11 and 14 feet and rose to depths of 6 to 8 feet after observation periods of one hour and forty-five minutes to two hours and fifty minutes. No water entered Borings B-1 and B-4 during dry augering. However, water was noted in Borings B-1 and B-4 at a depth of 14 feet and 12 feet after observations periods of thirty minutes and three hours and forty minutes, respectively. It should be realized, however, that the depth to water will fluctuate with rainfall, pond and creek levels, and other seasonal variations. Therefore, water levels should be verified prior to commencing any construction operations, such as excavations, which ground water may affect.

## LIMITATIONS

Professional judgments and recommendations are presented in this report. They are based partly on evaluations of technical information gathered and partly on our general experience with subsurface conditions in the area. We do not guarantee the performance of the project in any respect other than that our engineering work and the judgment rendered meet the standards and care of our profession. If, during construction, soil conditions are encountered that vary from those discussed in this report and/or configurations change, Woodward-Clyde Consultants should be notified immediately in order that they may evaluate the effects, if any, on the dikes' performance. It should be noted that the borings may not represent potentially unfavorable subsurface conditions between borings. If such conditions become evident, additional borings should be performed to characterize these conditions for design review. The recommendations presented in this report are applicable only to this specific site. These data should not be used for other purposes.

## ENGINEERING ANALYSIS

The dikes on the north and east sides of the waste water impoundment appear to consist of 4 to 8 feet of fill over the native ground surface. The thickness of the fill increases as the dikes proceed along the sides of the former depression at Borings B-3 and B-4 and turn to cross the depression and former creek channel at Borings B-1 and B-2. As noted on UOP's Drawing SH-1263, originally dated July 10, 1958, a dam was constructed across the top of the depression cutting off the flow from the creek into the pond. The dam was constructed of a clay core approximately 5 feet in height and width. It is not clear as to whether the core was keyed into the natural grade. The remainder of the dam is of unspecified materials. This dam appears to coincide with the current north dike. The current ditch was cut at that time to divert the creek flow.

The stability analyses for the dikes was based on the Janbu method of solution. The analysis considered the surface profile at Boring B-4, which is the steepest, to be the most critical. The factor of safety for the exterior slope appears

sufficient for dike stability even with the addition of up to 2 feet of additional fill material. The addition of dredged sludge placed adjacent to the interior slope acts as an interior berm from Borings B-2 to B-4 and has limited impact on the stability as long as the level of the sludge does not exceed the crest height of the dikes. It is recommended that the sludge height be kept a minimum of 2 feet below the crest height of the dike.

The presence of the vegetation and large trees on the exterior slope provides pinning of the slope in addition to erosion protection. A disadvantage of these large trees as pointed out in earlier reports is that upon their death and decay of the roots, a system of potential leakage paths will be created. The presence of the vegetation along the bank also adds to the drag forces on the creek when it floods resulting in a potentially higher backwater level. Any obstructions which potentially increase the backwater level during flow is contrary to the purpose of raising the height of the dikes.

We understand that the importance of the pond will diminish with time as the waste water recovery unit comes on line. Current plans call for the eventual lowering of the fluid level in the pond. The pond will then become an emergency unit when the waste water recovery system is shut down for either mechanical failure or maintenance.

In order to minimize the current construction and future maintenance costs, we recommend that the additional dike fill be tied into the crown of the dike between Borings B-2 and B-4 and not to the slopes. This will result in reducing the width of the dike at the top and not disturb the existing vegetation to any large degree on the exterior slope. Removal of the vegetation on the exterior slopes, in order to maintain the current crown width of the dike in this area, may initiate the scenario previously discussed concerning the potential development of leakage paths. The solution to this type of problem may require a cut-off wall to be constructed in the future through the crown of the dike to reduce flow through the dikes.

A typical design profile is presented on Figure 5 for the east dike between Borings B-2 and B-4. This design is based on the field observations, engineering analyses, and the attempt to minimize cost. The disadvantage, if any, is the reduction in crown width possibly impacting the trafficability in that area of the impoundment. The typical design profile for the north dike is shown on Figure 5. This design permits the widening of the dike since there is little vegetation to contend with. It should be realized that widening the dike in addition to increasing the height will result in some minor intrusion into the creeks' floodplain. Both designs require that the crust be removed and that new fill material be keyed into the existing dike.

An alternative to decreasing the crown width between Borings B-2 and B-4 would involve the removal of the dredged sludge from the interior slope. The crown of the dikes could then be constructed into the pond assuming the pond level can be reduced to expose the subgrade.

#### SITE PREPARATION AND SPECIFICATIONS

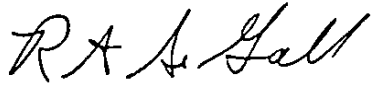
The details for site preparation and design specifications are presented in Appendix A. A plan view of the construction area in terms of station numbers and limits of clearing is presented on Figure 6, Construction Site. It should be noted that the moisture content of the borrow material is near or below the plastic limit indicating these materials may require some conditioning prior to placement and compaction. Conditioning may take the form of mixing and/or blending with proper moisture control to achieve the intended design. Most of the materials sampled at the selected borrow locations, are suitable for placement and compaction with the appropriate construction equipment. These materials in the laboratory have demonstrated tendencies to pump with moisture contents exceeding two percent of optimum in the Standard Proctor tests.

We appreciate the opportunity to be of service to you on this portion of the project and will be happy to discuss any questions you may have concerning this report. We look forward to implementing Phase 4, actual construction of the dikes.

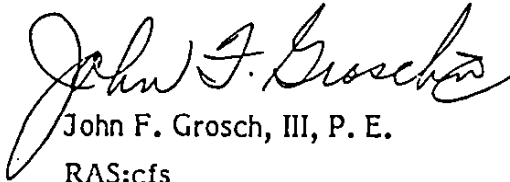
**Woodward-Clyde Consultants**

In addition to the undersigned, Mr. V. E. Sendukas, P. E., actively participated in the analyses and preparation of this report.

Very truly yours,



Robert A. SeGall



John F. Grosch, III, P. E.  
RAS:cfs

Copies Submitted: (3)

TABLE ONE  
BORROW INVESTIGATION  
OCTOBER 2, 1986

Borrow Designation	Depth, ft		Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	Other	Description
P-1	0	to 1	22	55/40	20/19	35/21	(1)	Red and tan Silty CLAYS
	1	to 5						Red and tan Silty CLAYS and CLAYS
P-2	0	to 1.5	26	73	23	50		Red and tan Silty CLAYS with roots
	1.5	to 5						Red and tan CLAYS with silt pockets
P-3	0	to 1.5	28	49	23	26	(2)	Red and gray Silty CLAYS
	1.5	to 6						Red and gray CLAYS and Silty CLAYS
P-4	0	to 1.5	17	52	23	29		Red, gray and tan Silty CLAYS with sand
	1.5	to 6						Gray and yellowish gray Silty CLAYS to CLAYS
P-5	0	to 2	-	-	-	-		Red Silty CLAYS to CLAYS
	2	to 6						Gray and yellowish gray Silty CLAYS to CLAYS with fine sand seams
P-6	0	to 2	13	50	22	28	(3)	Red and gray CLAYS
	2	to 6						Gray Silty CLAYS to CLAYS
P-7	0	to 1	29	82	39	43		Red and gray Silty CLAYS to CLAYS
	1	to 6						Red and gray CLAYS
P-8	0	to 1	-	-	-	-		Red and gray Silty CLAYS
	1	to 6						Red and gray Silty CLAYS and CLAYS

## NOTES

- (1) Tests performed on both silty and clayey portions of sample.  
Most samples contained silt streaks and pockets with a trace of sand.  
See Figure 2 for borrow locations.
- (2) See compaction curve.
- (3) See compaction curve.

# COMPACTION TEST

PROJECT UOP -DIKE MODIFICATION

FILE NO. 86C5134

DATE OCTOBER 2, 1986

BORING NO. -

SAMPLE NO. -

DEPTH COMPOSITE 1.5' to 6'

LOCATION PIT No. 3

SOIL DESCRIPTION Red and  
gray CLAYS and Silty CLAYS

TEST METHOD ASTM-D 698

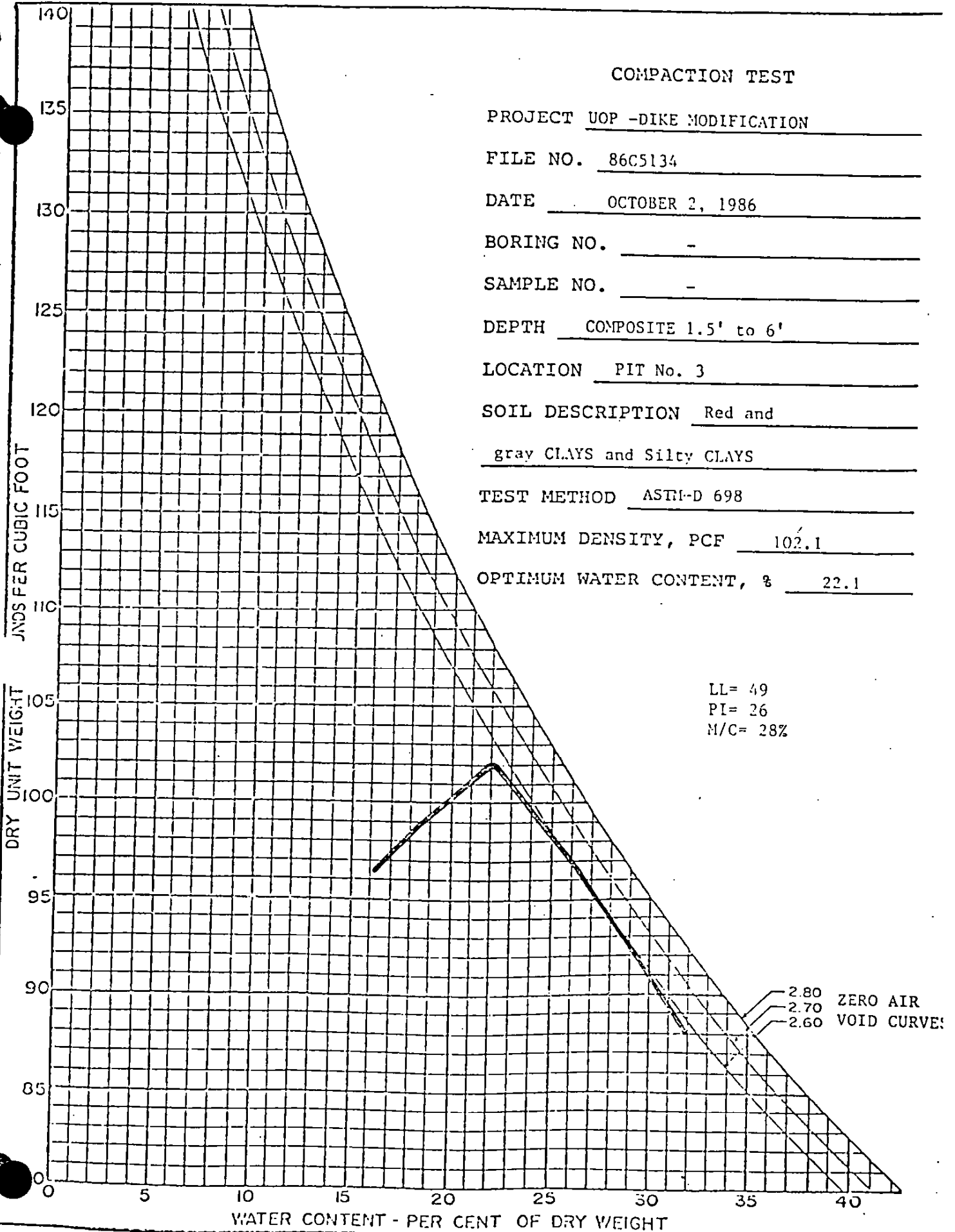
MAXIMUM DENSITY, PCF 102.1

OPTIMUM WATER CONTENT, % 22.1

LL= 49

PI= 26

M/C= 28%



WOODWARD-CLYDE CONSULTANTS

# COMPACTION TEST

PROJECT UOP -DIKE MODIFICATION

FILE NO. 86C5134

DATE OCTOBER 2, 1986

BORING NO. -

SAMPLE NO. -

DEPTH COMPOSITE 2' to 6'

LOCATION PIT No. 6

SOIL DESCRIPTION Grav silty

CLAYS TO CLAYS

TEST METHOD ASTM-D 698

MAXIMUM DENSITY, PCF 97.9

OPTIMUM WATER CONTENT, % 22.0

LL= 50

PI= 28

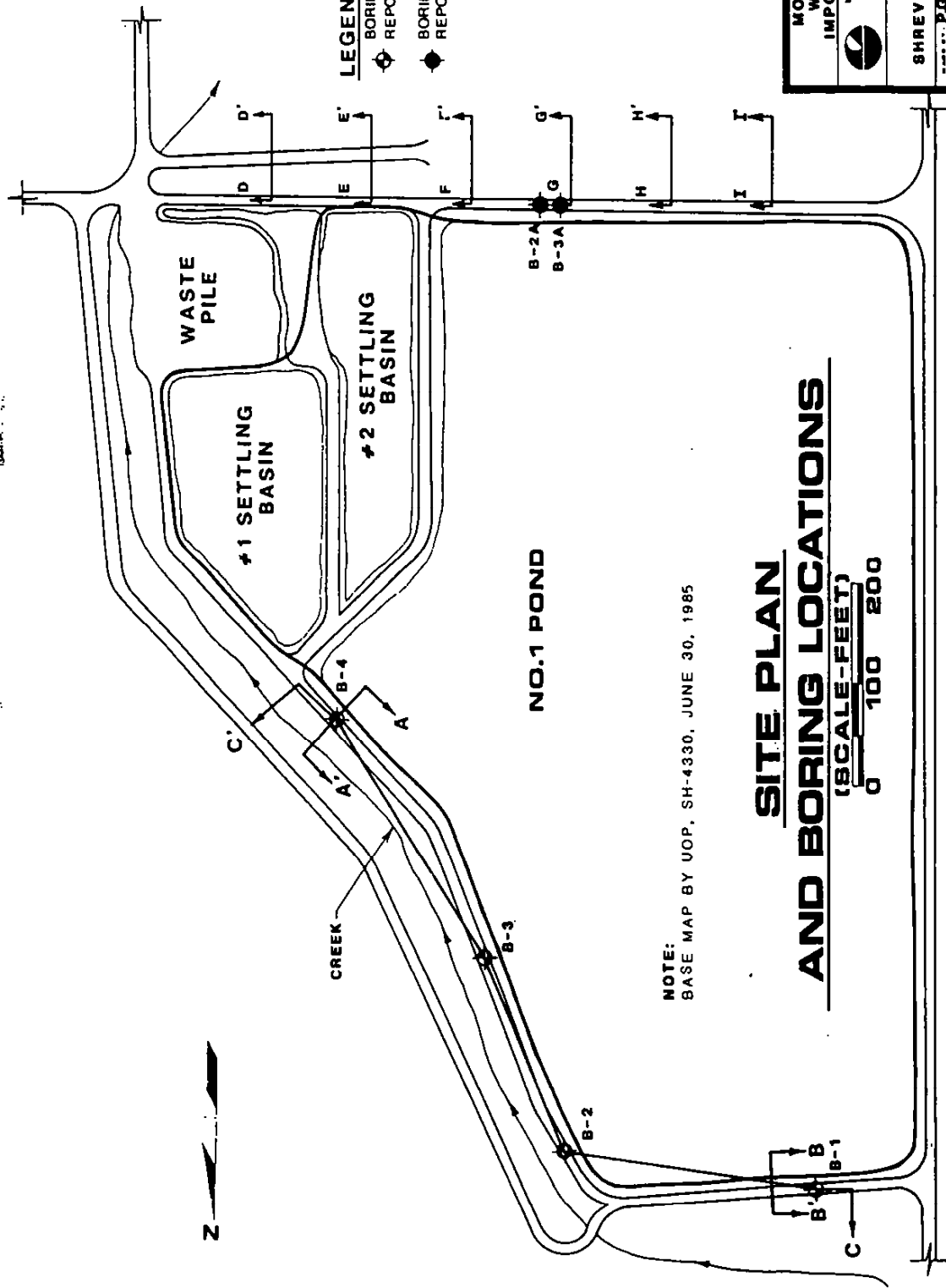
W/C= 13%

DRY UNIT WEIGHT - POUNDS PER CUBIC FOOT

WATER CONTENT - PER CENT OF DRY WEIGHT

2.80 ZERO AIR  
2.70 VOID CURVE  
2.60

WOODWARD-CLYDE CONSULTANTS



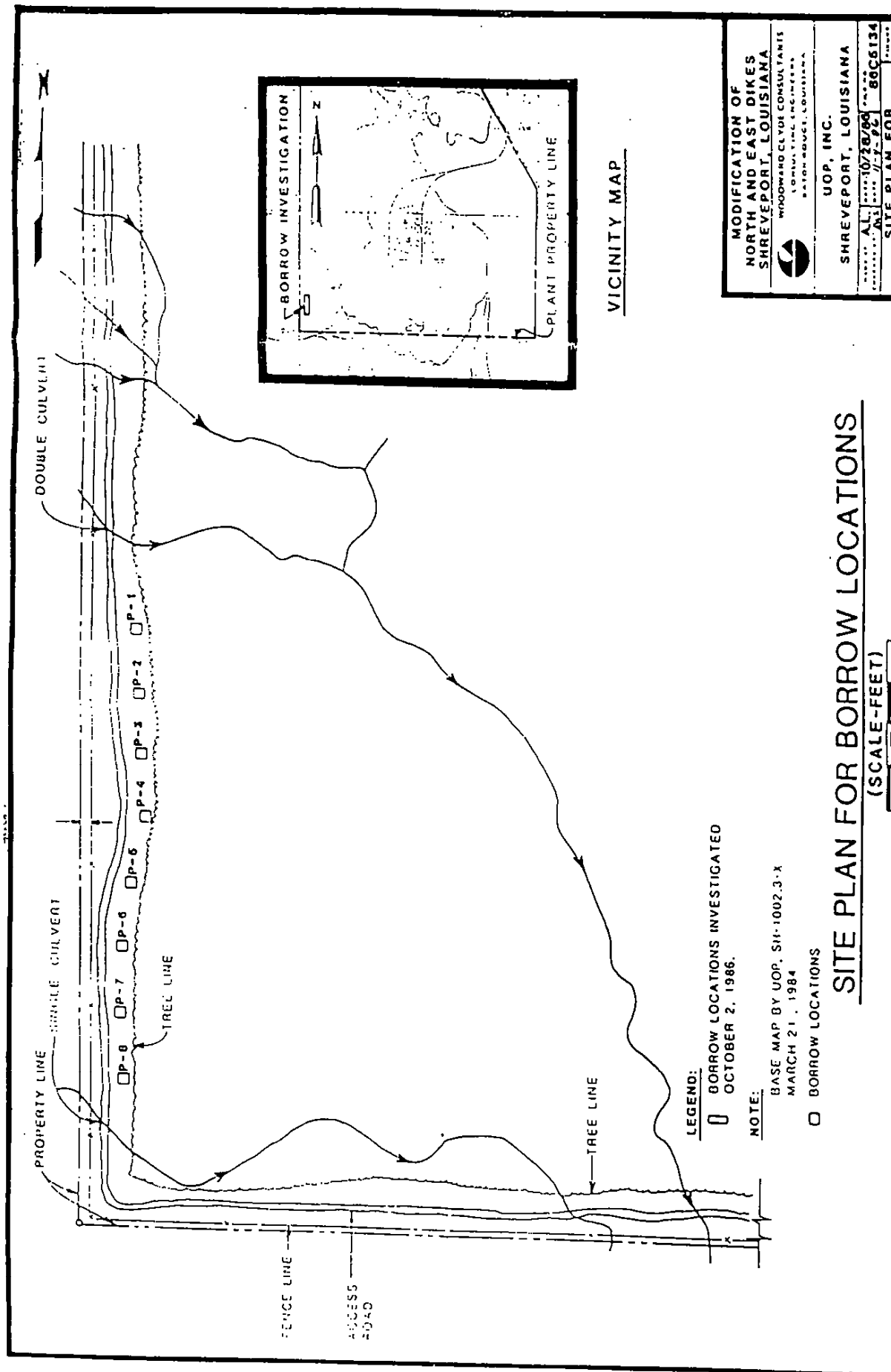
NOTE:  
BASE MAP BY UOP, SH-4330, JUNE 30, 1985

# **SITE PLAN AND BORING LOCATIONS** (SCALE-FEET) 0 100 200

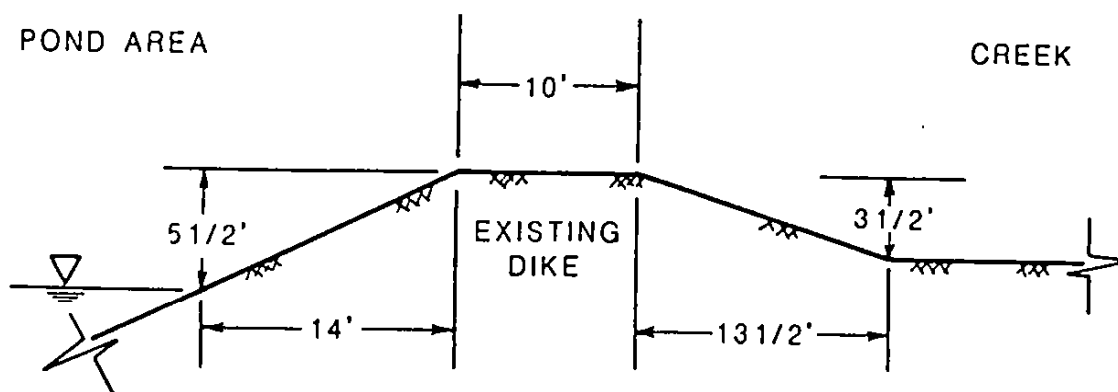
## **LEGEND**

- BORING LOCATIONS, WCC  
REPORT NOVEMBER 1986.
- BORING LOCATIONS, WCC  
REPORT MAY, 1986.

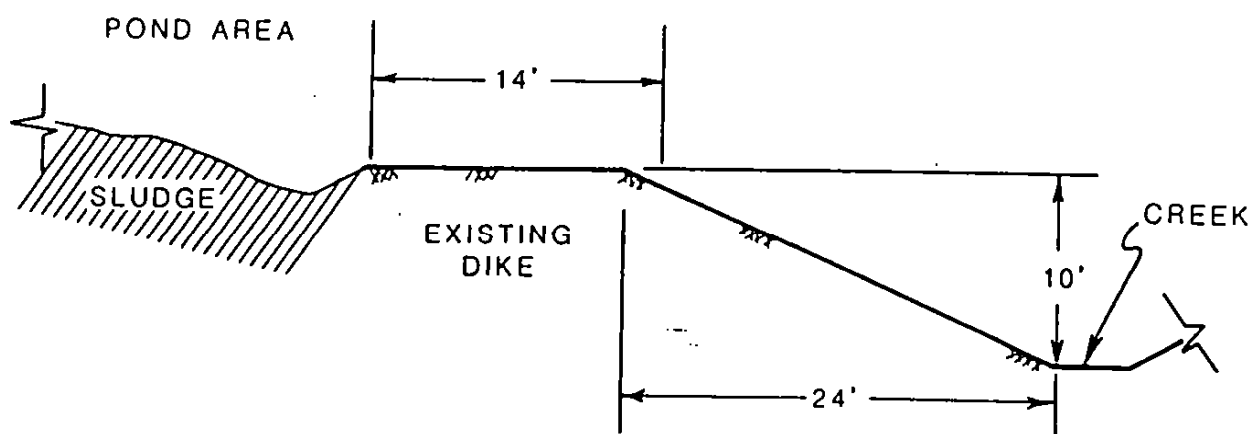
<b>MODIFICATION OF WASTE WATER IMPOUNDMENT DIKES</b>	
<b>WOODWARD CLYDE CONSULTANTS</b> CONSULTING ENGINEERS BAYON ROUGE, LOUISIANA	
<b>UOP, INC.,</b> SHREVEPORT, LOUISIANA	
PROJECT NO. 2/18/87 DRAWING NO. 88-5134 SHEET NO. 1	DATE 2/18/87 BY 88-5134 CHECKED BY 88-5134 APPROVED BY 88-5134
<b>SITE PLAN AND BORING LOCATIONS</b>	



# **SITE PLAN FOR BORROW LOCATIONS** (SCALE-FEET)



**TYPICAL PROFILE AT BORING B-1 B-B'**



**TYPICAL PROFILE AT BORING B-4 A-A'**

**MODIFICATION OF NORTH AND EAST DIKES  
SHREVEPORT, LOUISIANA**

UOP, INC.  
SHREVEPORT, LOUISIANA

WOODWARD-CLYDE CONSULTANTS

FILE: 86C5134  
OCTOBER, 1986

FIGURE 3

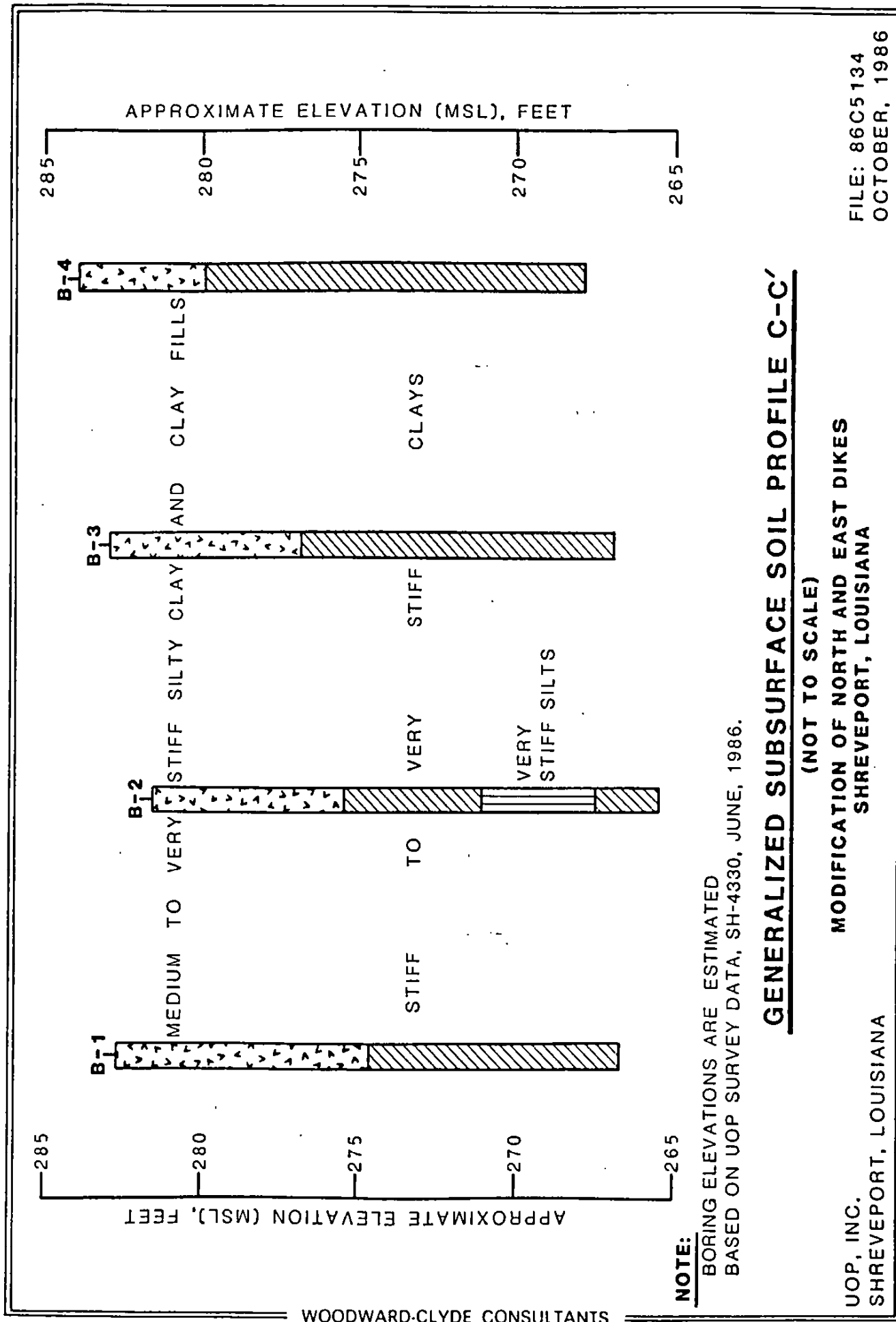
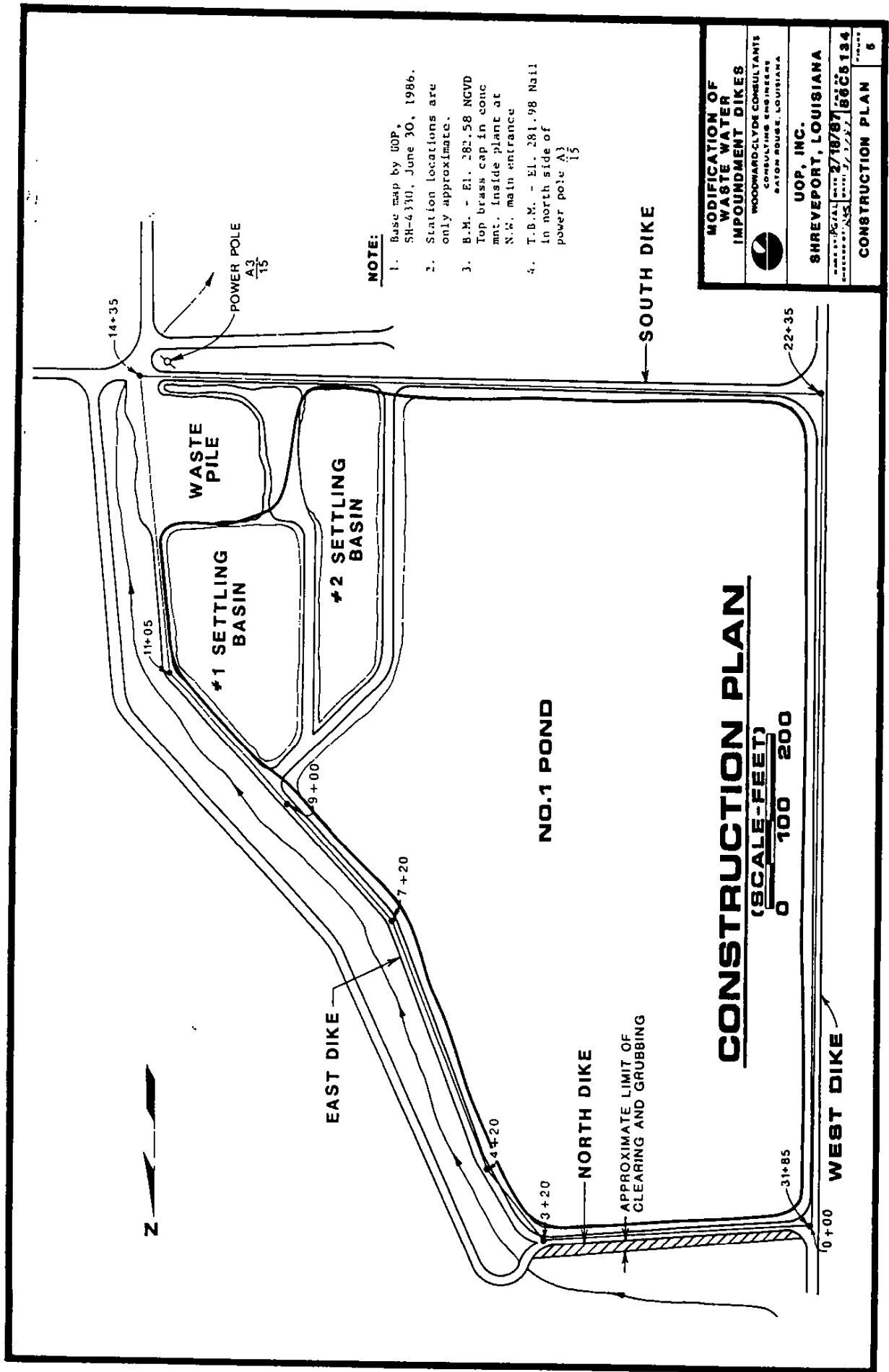
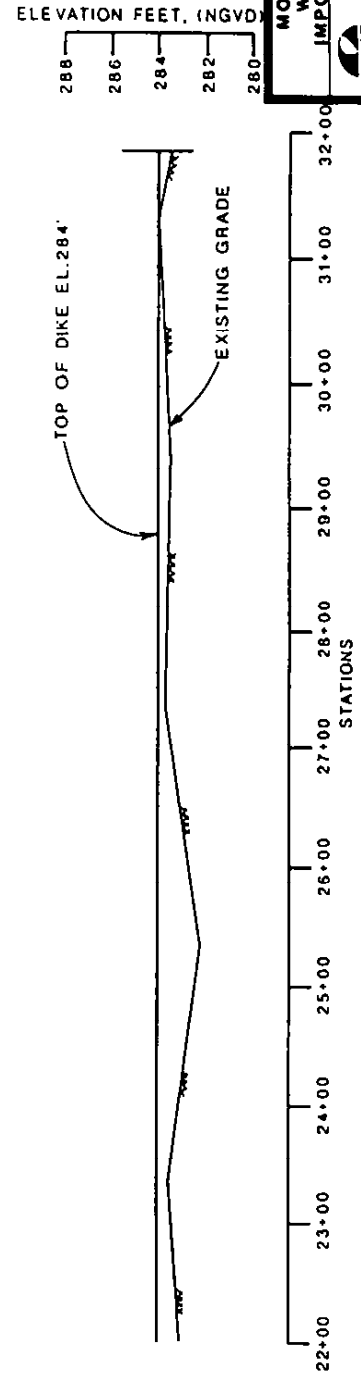
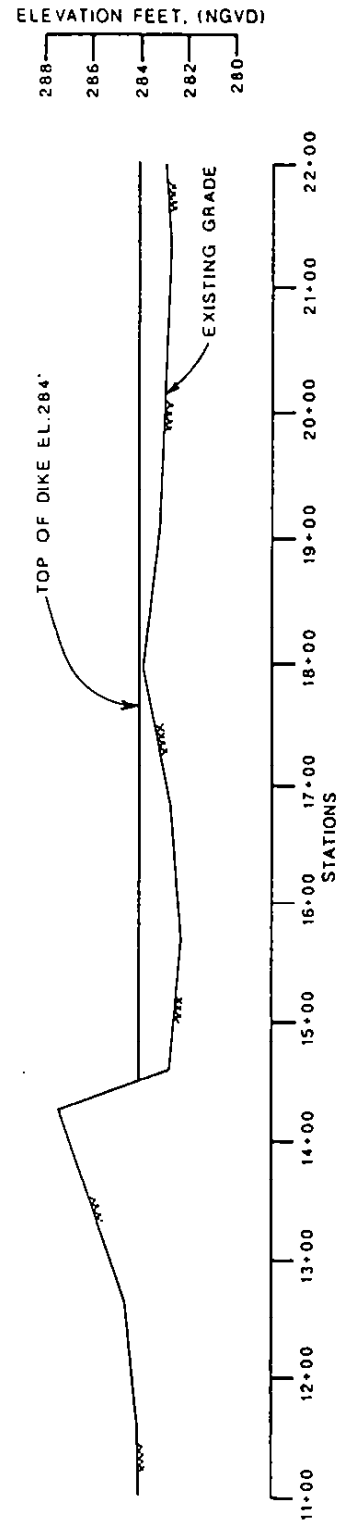
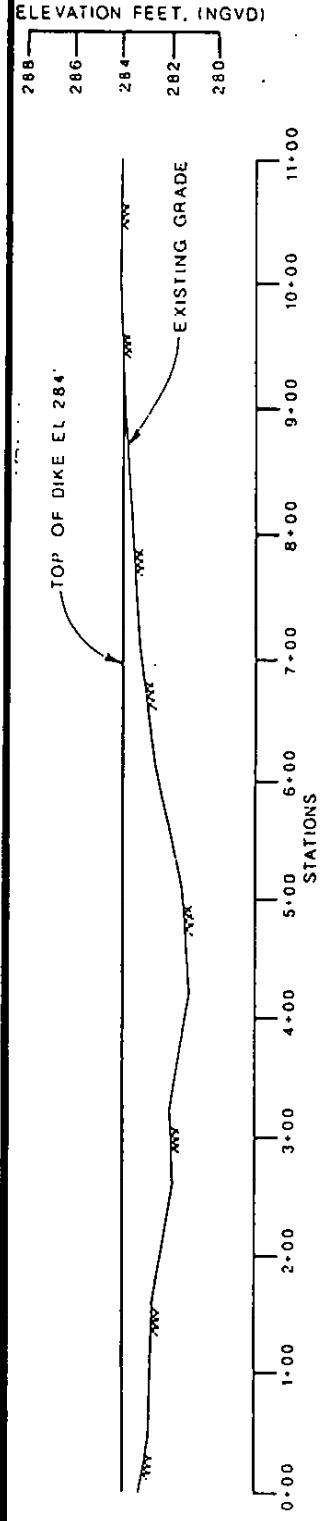



FIGURE 4





# **PROFILE LINE**

<b>MODIFICATION OF WASTE WATER IMPOUNDMENT DIKES</b>	
	<b>WOODWARD CLYDE CONSULTANTS</b> CONSULTING ENGINEERS BAYON BOULE, LOUISIANA
<b>UOP, INC.</b> SHREVEPORT, LOUISIANA	PROJECT NO. <b>86C5134</b> DATE <b>3/16/87</b>
<b>PROFILE LINE</b>	<b>6</b>

## LOG OF BORING

PROJECT Modification to Waste Water Impoundment  
 LOCATION North and East Dikes  
 CLIENT UOP Inc.

BORING B-1  
 FILE 86C5134  
 DATE 10-1-86  
 TECHNICIAN RAS  
 APPROVED *RAS*  
 PAGE 1 of 1

DEPTH (FEET)		DRY AUGERED FULL DEPTH						
SAMPLE		No water entered the borehole during dry augering; at 14' after 30 minute observation period.						
		S.P.T. (BLT) OR P.T. PEN. (TSF)	COMPRESSIVE STRENGTH (TSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	L.L. (%)	P.I. (%)	DESCRIPTION OF STRATUM
0		4.00						Very stiff red and gray CLAYS with silt and sand streaks, pockets and seams, ferrous nodules (FILL) --with trace of gravel
		4.00		17		55	36	
		4.00						
5		3.00	1.38	21	106	24	7	--stiff
		1.00						
10		3.00	1.83	26	98			Stiff gray and reddish tan CLAYS with silt streaks and pockets (CH) --with silt and sand seams
		3.00	1.47	26	95	54	29	
15		3.00						Bottom of boring at 16 feet Boring grouted full depth

Unified Soil Classifications based on limited laboratory test data and visual observations

## LOG OF BORING

PROJECT Modification to Waste Water Impoundment  
 LOCATION North and East Dikes  
 Blanchard, Louisiana  
 CLIENT UOP Inc.

BORING B-2  
 FILE 86C5134  
 DATE 10-1-86  
 TECHNICIAN RAS  
 APPROVED *RAS*  
 PAGE 1 of 1

DEPTH (FEET)		SAMPLE	DRY AUGERED FULL DEPTH					DESCRIPTION OF STRATUM	
			S.P.T. (BLT) OR P.T. PEN. (TSF)	COMPRESSION STRENGTH (TSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	L.L. (%)		P.I. (%)
0			4.50						Very stiff brown and red Silty CLAYS with sandy silt streaks, ferrous nodules, roots (FILL)
			4.50	0.97	20	102	35	12	
			N.R.						Medium to stiff brown and red Silty CLAYS with trace of gravel (FILL)
5			2.00						
			3.00	2.11	30	90	61	34	Very stiff gray and tan CLAYS with silt streaks and pockets, ferrous nodules (CH)
			4.50						
10									Very stiff gray and tan SILTS with clay laminations (ML)
			3.00	(1) 2.11	24	101			
15			4.50						Very stiff gray and tan CLAYS with silt streaks and pockets (CH)
									Bottom of boring at 16 feet Boring grouted full depth

N.R. = No recovery

(1) Unconsolidated undrained triaxial compression test with a confining pressure of 10 psi

Unified Soil Classifications based on limited laboratory test data and visual observations

## LOG OF BORING

PROJECT Modification to Waste Water Impoundment  
 LOCATION North and East Dikes  
 Blanchard, Louisiana  
 CLIENT UOP Inc.

BORING B-3  
 FILE 86C5134  
 DATE 10-1-86  
 TECHNICIAN RAS  
 APPROVED *RAS*  
 PAGE 1 of 1

DEPTH (FEET)		FULL DEPTH						
0		Water entered the borehole at 14' during dry augering; rose to 7'-4" after 2 hour 50 minute observation period.						
SAMPLE		S.P.T. (LFT) OR P.T. PEN. (TSF)	COMPRESSIVE STRENGTH (TSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	L.L. (%)	P.I. (%)	DESCRIPTION OF STRATUM
4.50								Very stiff red and tan CLAYS with silt pockets, ferrous nodules (FILL)
4.50				23		67	42	
5 2.00								--with trace of gravel
2.50		1.50		30	90	70	44	Stiff gray and tan CLAYS with silt streaks, pockets and seams (CH)
4.50								
10 4.50		1.95		27	96			--with sand pockets and seams
4.50								
15 4.50								
								Bottom of boring at 16 feet Boring grouted full depth

Unified Soil Classification based on limited laboratory test data and visual observations

## LOG OF BORING

PROJECT Modification to Waste Water Impoundment  
 LOCATION North and East Dikes  
 Blanchard, Louisiana  
 CLIENT UOP Inc.

BORING B-4  
 FILE 86C5134  
 DATE 10-1-86  
 TECHNICIAN RAS  
 APPROVED *RAS*  
 PAGE 1 of 1

DEPTH (FEET)		SAMPLE	DRY AUGERED FULL DEPTH					
No water entered the borehole during dry augering; at 12'-4" after 3 hour 40 minute observation period								
		S.P.T. (BLF) OR P.T. PEN. (TSF)	COMPRESSIVE STRENGTH (TSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LL (%)	P.I. (%)	DESCRIPTION OF STRATUM
0		4.50						Very stiff red and tan CLAYS with roots, silt pockets and seams, ferrous nodules (FILL)
		4.50						
		3.00						
		3.00	2.99	23	99	80	55	
5		4.50						Very stiff to hard gray and tan CLAYS with silt pockets (CH) --with trace of sand
		4.50						
		4.50	4.48	18	110	50	31	
		4.50						
10								--with silt seams below 11'
		4.50						
		4.50	2.21	19	104			
15		4.50						Bottom of boring at 16 feet Boring grouted full depth

Unified Soil Classification based on limited laboratory test data and visual observations

APPENDIX A

CONSTRUCTION SPECIFICATIONS  
FOR  
MODIFICATION OF NORTH AND EAST DIKES

1.0 INTRODUCTION

The modification plan for the north and east dikes surrounding the waste water impoundment is to be implemented at UOP Inc., Shreveport plant, located near Shreveport, Louisiana. The plan requires increasing the crown elevation of the dikes approximately 1 to 2 feet.

2.0 PREBID MEETING

A prebid meeting will be held with all invited bidders in attendance. The meeting will consist of discussions of the drawings, specifications and physical data; site inspection; and question and answer period. A record will be made of the meeting and all conclusions, interpretations and agreements will become a part of the contract as Addendum 001.

3.0 SCOPE

The modification plan for the dikes consists of raising the crown elevation of the dikes approximately 1 to 2 feet. The dikes are approximately 900 feet in length and 10 to 14 feet in crown width. The final configuration of the dikes will be approximately 900 feet in length and 6 to 12 feet in width, with a final crown elevation of 284 feet MSL. The north and east dikes surrounding the waste water impoundment shall be constructed in accordance with these specifications and in conformity with the dimensions and typical sections of the plans. The Contractor shall do all work and shall furnish all equipment, materials, supplies, tools, labor and incidentals necessary to prosecute the completion of the work.

#### 4.0 GENERAL PROVISIONS

##### 4.1 Site Investigation

The Contractor acknowledges that he has investigated and satisfied himself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, uncertainties of weather, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from information presented by the drawings and specifications made a part of this contract. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

##### 4.2 Control of Work

The control and review of the work in this contract shall be performed by the Owner and/or his designated Representatives. The use of the term Owner in this specification shall mean the Owner and/or his designated Representatives. The Owner shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed and as to the manner of performance and rate of progress of work.

4.3 Conformity with Plan and Specifications

All work and materials furnished shall be in accordance with the lines, grades, cross sections, dimensions, materials requirements and testing requirements that are specified in the contract, plans and specifications. All work shall be constructed with the intent of achieving final dike elevations of 284 feet MSL. The Contractor shall employ only competent personnel and utilize only suitable equipment in performing the work.

4.4 Authority and Duties of Owner's Representatives

The Owner's Representatives shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work specified herein. Owner's Representatives are not authorized to revoke, alter, or waive any provisions of the contract, or to act as foreman for the Contractor.

Representatives employed by the Owner are authorized to notify the Contractor or his Representative of any failure of the work or materials to conform to the requirements of the contract, plans, specifications and to reject such nonconforming materials in question.

4.5 Inspection of the Work

All materials and each part of the detail of the work shall be subject to inspection. The Owner or his Representative shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make the inspection.

Upon request, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work for inspection as may be directed by the Owner or his Representative.

After examination, the Contractor shall restore said portions of the work to the standard required by the specifications.

**4.6 Removal of Unacceptable Work**

All work which does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable and shall be removed immediately and replaced in an acceptable manner.

Work done contrary to the instructions of the Owner, work done beyond the lines shown on the plans or as given, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

**4.7 Storage of Materials**

Suitable storage facilities, when necessary, shall be furnished by the Contractor. All materials, supplies and equipment intended for use in the work shall be stored by the Contractor to prevent damage from exposure, admixture with foreign substances, or vandalism.

**4.8 Progress of Work**

Before work shall be started and materials ordered, the Contractor shall meet and consult with the Owner relative to materials, equipment and all arrangements for prosecuting the work. The work shall be prosecuted at such time and in or on such part or parts of the project and with such forces of workmen, materials, and equipment to complete the project as contemplated in the drawings, specifications and contract.

If the Contractor desires to carry on work at night or outside the regular hours, he may submit application to the Owner, but he shall allow ample time to enable satisfactory arrangements to be made for inspecting the work in progress. If granted permission, he shall light the different parts of the work in a manner satisfactory to the Owner and shall comply with all specifications.

4.9 Schedule of Work

The Contractor shall submit a schedule of the work for review and approval by the Owner, showing approximately the dates on which each part or division of the work is expected to be started and finished.

The work shall be scheduled to minimize interference with traffic and public utility services. It shall be the Contractor's responsibility to maintain traffic on all thoroughfares. The Owner shall have the right to re-schedule work where objectionable interference is indicated.

4.10 Preservation of Property

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in any way affected by the work, the removal or destruction of which is not called for by the plans. Wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor at his own expense.

4.11 Cleanup

It is the Contractor's responsibility to maintain cleanup during the progress of the work. The Contractor's schedule of work, as required in Section 4.9, shall reflect the Contractor's planning for continuous cleanup. After completion of construction and prior to final

acceptance, the Contractor shall remove from the site all construction equipment, unused material and debris. It is the intent of this specification that the construction areas used by the Contractor shall be restored to their original condition as nearly as possible.

Adequate sanitary convenience for the use of persons employed on the project work, properly secluded from public observation, shall be provided and maintained by the Contractor in such a manner and at such points as shall be approved by the Owner. These conveniences shall be maintained at all times without nuisance and their use shall be strictly enforced. Upon completion of the work they shall be removed from the premises, leaving all clean and free from nuisance.

#### 4.12 Surveys

The Contractor shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during construction. Quantity surveys made by the Contractor shall be made and shall be subject to the approval of the Owner.

The Owner may make checks as the work progresses to verify lines and grades established by the Contractor and to determine the conformance of the completed work as it progresses with the requirements of contract specifications and drawings. Such checking by the Owner shall not relieve the Contractor of his responsibility to perform all work in accordance with the contract drawings and specifications.

The Contractor shall furnish all labor, stakes, and other materials and supplies for establishing lines, position of structures, slopes and other controlling points necessary for the proper prosecution of the construction work.

**4.13 Water**

The Contractor shall furnish all water necessary for the construction work. The water shall be potable and free of chemical or organic contamination. The water shall have an acid/alkali pH of approximately 7.0. Chemical and biological analysis for the water supply source shall be provided to the Owner.

**4.14 Electric Power**

The Contractor shall be responsible for obtaining or furnishing his necessary electric power. The power can be obtained by arrangement with the owner, local utility or by the Contractor's furnished generator.

**4.15 Final Acceptance**

Upon due notice from the Contractor of presumptive completion of the entire project, the Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be completed in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Owner will notify the Contractor in writing of final acceptance as of the date of the final inspection.

**5.0 SITE PREPARATION**

**5.1 Relocation of Utilities and Process Lines**

All process lines and utilities will be relocated as required for construction and as approved by the Owner.

5.2 Road Preparation and Maintenance

The Contractor shall be completely responsible for the road, roadway, road foundation, utility lines, pipeline installations, and drainage for in-plant roads used during construction. The improvement work required shall commence at the beginning of the contract and the improvement work shall be completed as timely as possible in order to be useful for the anticipated construction traffic. The Contractor shall be responsible for design and construction of the roadways to accommodate the anticipated traffic. The Contractor shall coordinate all improvement and maintenance activities with the Owner. The Contractor shall be responsible for location and installation of traffic signs to improve traffic safety and the traffic pattern flow. If need develops the Contractor shall provide the necessary flagmen to aid and improve traffic safety and flow during peak traffic volume operations.

5.3 Clearing, Stripping and Grubbing

Clearing shall consist of the felling, and satisfactory disposal of all trees, down timber, scrub, undergrowth, brush, grass, weeds and similar debris within the area to be cleared. The area to be cleared is defined as 5 feet beyond the foundation boundaries of the north dike. Trees shall be felled in such a manner as to avoid damage to trees which are to be left standing, to any existing structures and installations, and to those under construction as well as with due regard for the safety of employees and others. The area shall be stripped to a minimum depth of 6 inches or as directed by the Owner or his Representative. Grubbing shall consist of the removal and disposal of stumps, roots larger than 1½ inches in diameter, and matted roots from the designated grubbing areas. This material, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be excavated and removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated as foundation areas under this contract. Depressions

made by grubbing shall be filled with suitable material approved by the Owner or his Representative and compacted to make the surface conform with the original adjacent surface of the ground. All clearing, stripping and grubbing activities shall be inspected and approved by the Owner or his Representative prior to commencing construction. Except as directed by the Owner, all debris which are products of the clearing, stripping, and grubbing operations shall be disposed of on-site.

#### 5.4 Development of On-Site Borrow Areas

If the Contractor elects to develop and utilize on-site borrow areas they shall conform to the requirements of other sections of this specification. The limits for the borrow area and its depth shall be subject to approval by the Owner or his Representative. Multiple on-site borrow areas may provide suitable materials. The clearing, grubbing and stripping of the borrow area shall conform to Section 5.3. Any earthwork done for the convenience of the Contractor, including access ramps shall be at the Contractor's expense. Upon completion of the contract or the exhaustion of usable soils, the borrow areas will be graded as directed by the Owner or his Representative to minimize erosion. The borrow areas will then be covered with a vegetative cover in accordance with Section 8.0.

### 6.0 CONTROL OF WATER

The Contractor shall be solely responsible for the control of water. The Contractor shall submit his plans for Control of Water to the Owner for review and comments. The Owner will assume no responsibility by this review nor does it relieve the Contractor of the responsibility of implementing a successful plan for control of water.

## 7.0 NORTH AND EAST DIKES

### 7.1 Materials

The dike fill recommended is a clean, select fill, free of excess silt, clay balls or other deleterious matter, having a minimum plastic limit of 10, plasticity index between 25 to 45 and a liquid limit less than 75 and/or be approved by the Owner or his Representative.

### 7.2 Site Preparation

The north dike foundation shall be cleared, stripped and grubbed as discussed in Section 5.3. Roots or other intrusions over 1½ inches in diameter within the dike foundation area shall be removed to a minimum depth of 2 feet below natural ground surface. The sides of all holes and depressions caused by such operations shall be flattened before backfilling. Backfill shall be placed in 6-to-8-inch loose lifts compacted to a density equal to the adjoining undisturbed material up to the original grade. All unsuitable surface soils will be stripped, including loose or soft surface materials, vegetation, topsoil, etc. The upper 12 inches of the dikes, including the new fill material, will be keyed a minimum of 12 inches deep and 2 feet wide into the existing dike. Just prior to placement of the first lift of fill the subgrade will be scarified to ensure a good bond between the subgrade and fill and to eliminate a plane of weakness at the interface. Drainage will be maintained away from the subgrade during construction.

### 7.3 Placement and Compaction Procedures

The soil to be compacted for the dikes shall be placed in lifts not exceeding 9 inches loose thickness and compacted to 95 percent of the maximum density as determined by the ASTM D-698 Standard Proctor Test. The compacted moisture content shall be equal to or slightly greater than the optimum value obtained from the lab test. Prior to

placing the subsequent lift, the previously placed and compacted lift shall be examined and approved by the Owner or his Representative. When the surface of any compacted layer is too smooth to bond properly with the next layer it shall be adequately scarified before the next lift is placed thereon.

The Contractor shall establish and demonstrate to the satisfaction of the Owner or his Representative operating procedures whereby uniform water content, compaction, and coverage of an area are obtained.

The surface of the fill shall be graded to permit and enhance runoff of rainfall. At the completion of each day's operation, the surface of the uncompacted fill shall be sealed. Discing shall be required prior to recommencing fill operations. Upon completion of fill placement, the crown of the dikes shall be topped with a minimum of 2 inches of iron ore slag.

During the course of the construction of the dikes, if a work stoppage should occur for reasons other than inclement weather, the Contractor shall take adequate measures to prevent drying of the compacted fill and stockpiled materials. These methods will be subject to the approval of the Owner or his Representative.

#### 7.4 Field Testing

During the progress of the work the Owner's Representative will conduct in-place field density tests to estimate the in-situ moisture content and density. The Contractor shall schedule the fill placement and compaction to permit in-place testing of the fill. No additional lifts of fill material shall be placed until the in-place lift has been approved by the Owner's Representative.

## 8.0 VEGETATIVE COVER

The Contractor shall construct a vegetative cover for the borrow area as directed by the Owner or his Representative. The entire surface of the borrow area shall be covered with a minimum of 6 inches of uncompacted, fertile topsoil which is stabilized with a self-sustaining vegetative cover to minimize erosion. The topsoil seeding and fertilizer shall be in accordance with the applicable requirements of Sections 715, 717, and 718, of the Louisiana Department of Transportation and Development (DOTD) Standard Specifications for Roads and Bridges (1982 Edition). Final acceptance will not be made until seeded areas have become established.